IBM XIV Storage System

Planning Guide

Version 2.5

GA32-0770-03

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GA32-0770-03

Note

Before using this information and the product it supports, read the information in “Safety and environmental notices” on page ix and Notices.

This edition applies to version 2, release 5, of IBM XIV Storage System, and to all subsequent releases and modifications until otherwise indicated in new editions.

This edition replaces GA32-0770-02.

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Safety and environmental notices

Use this information to learn about important safety tips and environmental notices.

Safety notices

This publication contains safety notices for the IBM® XIV® Storage System. The safety notices include danger and caution notices. Anyone who plans, installs, operates, or services the system must be familiar with and understand the safety notices contained herein. Read the related safety information before beginning work.

The *IBM XIV Storage System Safety Notices* publication is available on the Web at http://publib.boulder.ibm.com/infocenter/ibmxiv/r2/topic/com.ibm.help.xiv.doc/docs/GA32-0832-00.pdf

To view a PDF file, you need Adobe Acrobat Reader, which can be downloaded for free from the Adobe (www.adobe.com/products/acrobat/readstep.html).

Safety notices and labels

When using this product, observe the danger, caution, and attention notices contained in this guide. The notices are accompanied by symbols that represent the severity of the safety condition.

Be sure to read all caution and danger statements in this documentation before performing the instructions. Read any additional safety information that comes with the equipment or other devices before installing or repairing the device.

The following notices and statements are used in IBM documents. They are listed below in order of decreasing severity of potential hazards.

DANGER

These statements indicate situations that is potentially lethal or extremely hazardous to people. A lightning bolt symbol accompanies a danger notice to represent a dangerous electrical condition. Safety labels are attached directly to products to warn of these situations.

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CAUTION:
These statements indicate situations that are potentially hazardous to people because of some existing condition or where a potentially dangerous situation might develop because of some unsafe practice. A caution notice might be accompanied by the symbols shown in Table 1.

Table 1. Caution notice symbols

Symbol	Description
	A risk of electrical shock or an energy hazard.
	A generally hazardous condition not represented by other safety symbols.
	A hazardous condition due to the use of a laser in the product. Laser symbols are always accompanied by the classification of the laser as defined by the U. S. Department of Health and Human Services (for example, Class I, Class II, and so forth).

Attention: These notices indicate potential damage to programs, devices, or data. An exclamation point symbol might accompany an attention notice, but is not required.

Note: These notices provide important tips, guidance, or advice.

All caution and danger statements in this document are referenced with a letter and digit identifier. This identifier is used to cross reference an English caution (C) or danger (D) statement with translated versions of the caution or danger statement in *IBM XIV Storage System Safety Notices*. For example, if a danger statement contains the identifier D004, translations for that danger statement appear in *IBM XIV Storage System Safety Notices* under statement D004.

In addition to these notices, labels might be attached to the product to warn of potential hazards.

Special caution and safety notices

This information describes special safety notices that apply to the IBM XIV Storage System. These notices are in addition to the standard safety notices supplied and address specific issues relevant to the equipment provided.

Laser safety

When using an NVRAM5 or NVRAM6 cluster media converter, the storage system must be installed in a restricted access location.

CAUTION:
This product contains a Class 1M laser. Do not view directly with optical instruments. (C028)

This equipment contains Class 1 laser products, and complies with FDA radiation Performance Standards, 21 CFR Subchapter J and the international laser safety standard IEC 825-2.

CAUTION:
Data processing environments can contain equipment transmitting on system links with laser modules that operate at greater than Class 1 power levels. For this reason, never look into the end of an optical fiber cable or open receptacle. (C027)

Attention: In the United States, use only SFP or GBIC optical transceivers that comply with the FDA radiation performance standards, 21 CFR Subchapter J. Internationally, use only SFP or GBIC optical transceivers that comply with IEC standard 825–1. Optical products that do not comply with these standards may produce light that is hazardous to the eyes.

Usage restrictions: The optical ports of the modules must be terminated with an optical connector or with a dust plug.

Ladder usage

A step or platform ladder might be necessary to service higher modules. An OSHA/CSA approved non-conductive step/platform ladder specified for at least a 136.4 kg (300 lb.) load capacity should be used. See ladder specification in the IBM Test Equipment Service Center web catalog.

Fire suppression systems

A fire suppression system is the responsibility of the customer. The customer's own insurance underwriter, local fire marshal, or a local building inspector, or both, should be consulted in selecting a fire suppression system that provides the correct level of coverage and protection.

IBM designs and manufactures equipment to internal and external standards that require certain environments for reliable operation. Because IBM does not test any equipment for compatibility with fire suppression systems, IBM does not make compatibility claims of any kind nor does IBM provide recommendations on fire suppression systems.

Power cords

Use only IBM approved UL power cords.

For your safety, IBM provides a power cord with a grounded attachment plug to use with this IBM product. To avoid electrical shock, always use the power cord and plug with a correctly grounded outlet. IBM power cords used in the United States and Canada are listed by Underwriter's Laboratories (UL) and certified by the Canadian Standards Association (CSA). For units intended to be operated at 115 volts: Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a parallel blade, grounding-type attachment plug rated 15 amperes, 125 volts. For units intended to be operated at 230 volts (U.S. use), use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a tandem blade, grounding-type attachment plug rated 15 amperes, 250 volts. For units intended to be operated at 230 volts (outside the U.S.), ue a cord set with a grounding type attachment plug. The cord set must have the appropriate safety approvals for the country in which the equipment is to be installed. IBM power cords for a specific country or region are usually available only in that country or region.

Connect all power cords to a correctly wired and grounded electrical outlet. Ensure that the outlets supplies correct voltage and phase rotation according to the system rating plate. Ensure that all customer facility outlets are protected with circuit breakers rated at maximum for 30 Amps. The power cord plugs operate as the system main-disconnection method.

Sound pressure

Attention: Depending upon local conditions, the sound pressure could exceed 85 dB(A) during service operations. In such cases, proper hearing protection should be worn.

Site preparation

The IBM authorized service provider will only perform minimal frame repositioning within the room, as needed, to perform required service actions. The customer is responsible for using professional movers or riggers in the case of equipment relocation or disposal.

DANGER

Heavy equipment - personal injury or equipment damage might result if mishandled. Use only professional movers.

PN 23R0316
> 500 lbs. (> 227 kg.)
Use Only
Professional Movers!
Use Only Professional Movers!
يجب الاستعانة بخبرات نقل متخصصة
Utilizar somente transportadores profissionais
Faire appel à des professionnels seulement pour déplacer l'équipement.
只能使用专业搬运机
Maak gebruik van professionele verhuizers
Faites exclusivement appel à des déménageurs professionnels
Nur professionelle Transportunternehmen mit der Durchführung beauftragen.
Να μετακινείται μόνο από επαγγελματίες μεταφορείς
העזרו במובילים מקצועיים בלבד
Csak hivatásos szállítóval költöztesse
Avvalersi solo di trasportatori esperti
機器を移動する際には専門の業者に依頼してください。
전문 운송 인력만이 이동시킬 수 있습니다.
Należy korzystać wyłącznie z usług wyspecjalizowanych firm.
El traslado del equipo debe realizarlo personal especializado
Trebaju raditi samo profesionalni transportni radnici
Použijte pouze profesionální stěhováky
Brug kun professionelle flyttefolk.
Käytä vain ammattitaitoista kuljetusliikettä
Utstyret må kun flyttes av godkjent flyttepersonell
Contacte apenas transportadoras profissionais
Используйте только профессиональных грузчиков
Na presun použite len profesionálov
Använd endast professionell flyttpersonal
xiv10012

Environmental notices

This publication contains all the required environmental notices for IBM Systems products in 26 languages. The environmental notices included are limitations, product recycling and disposal, product information, battery return program, flat panel display, monitors and workstations, refrigeration, and water cooling system.

IBM Systems Environmental Notices and User Guide (ftp://public.dhe.ibm.com/systems/support/warranty/envnotices/environmental_notices_and_user_guide.pdf), Z125-5823

To view a PDF file, you need Adobe Acrobat Reader, which can be downloaded for free from the Adobe (www.adobe.com/products/acrobat/readstep.html).

About this guide

This document defines preinstallation requirements for IBM XIV Storage Systems. It is important to ensure that you meet all requirements to guarantee a fast and reliable installation.

If you cannot meet any of the installation requirements explained in this document, notify your IBM representative to devise alternative solutions.

Who should use this guide

This publication is for personnel that are involved in planning. Such personnel include IT facilities managers, individuals responsible for power, cooling, wiring, network, and general site environmental planning and setup.

Conventions used in this guide

These notices are used to highlight key information.

Note: These notices provide important tips, guidance, or advice.

Important: These notices provide information or advice that might help you avoid inconvenient or difficult situations.

Attention: These notices indicate possible damage to programs, devices, or data. An attention notice appears before the instruction or situation in which damage can occur.

CAUTION:
These notices indicate a situation that is potentially hazardous to people because of some existing condition or where a potentially dangerous situation might develop because of some unsafe practice.

DANGER

These notices indicate a situation that is potentially lethal or extremely hazardous to people. For example, after a computer side panel is removed, exposed high-voltage wires might be lethal.

Publications and related information

Product manuals, other IBM publications, and websites contain information that relates to the IBM XIV Storage System.

To view a PDF file, you need Adobe Acrobat Reader, which can be downloaded for free from the Adobe (www.adobe.com/products/acrobat/readstep.html) website.

Information centers

From the IBM XIV Storage System Information Center (publib.boulder.ibm.com/infocenter/ibmxiv/r2/index.jsp), you can browse all product documentation.

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Publications

Information that is available in the information center is also available in a set of publications, in PDF format.

IBM XIV Storage System

- *IBM XIV Storage System Product Overview* (publib.boulder.ibm.com/infocenter/ibmxiv/r2/topic/com.ibm.help.xiv.doc/docs/GA32-0791-01.pdf)

  This document contains an overview of the IBM XIV Storage System hardware and software.

- *IBM XIV Storage System Planning Guide* (publib.boulder.ibm.com/infocenter/ibmxiv/r2/topic/com.ibm.help.xiv.doc/docs/GA32-0770-03.pdf)

  This document defines preinstallation requirements for IBM XIV Storage Systems. It is important to ensure that you meet all requirements to guarantee a fast and reliable installation.

- *IBM XIV Storage System Host Attachment Guides*

  These documents provide information about attaching host systems to the IBM XIV Storage System:

  - *Host System Attachment Guide for AIX* (publib.boulder.ibm.com/infocenter/ibmxiv/r2/topic/com.ibm.help.xiv.doc/docs/hag_1_5_x/GA32-0643-06.pdf)
  - *Host System Attachment Guide for HP-UX* (publib.boulder.ibm.com/infocenter/ibmxiv/r2/topic/com.ibm.help.xiv.doc/docs/hag_1_5_x/GA32-0645-02.pdf)
  - *Host System Attachment Guide for Linux* (publib.boulder.ibm.com/infocenter/ibmxiv/r2/topic/com.ibm.help.xiv.doc/docs/hag_1_5_x/GA32-0647-02.pdf)
  - *Host System Attachment Guide for Solaris* (publib.boulder.ibm.com/infocenter/ibmxiv/r2/topic/com.ibm.help.xiv.doc/docs/hag_1_5_x/GA32-0649-02.pdf)
  - *Host System Attachment Guide for Windows* (publib.boulder.ibm.com/infocenter/ibmxiv/r2/topic/com.ibm.help.xiv.doc/docs/hag_1_5_x/GA32-0652-03.pdf)

- *IBM XIV Storage System XCLI Reference Guide* (publib.boulder.ibm.com/infocenter/ibmxiv/r2/topic/com.ibm.help.xiv.doc/docs/GC27-2213-07.pdf), GC27-2213

  This document describes the IBM XIV command-line interface (XCLI) system and utility commands used to manage and maintain the XIV system, including the command syntax, parameter descriptions, output descriptions, and examples.

- *IBM XIV Storage System XCLI User Manual* (publib.boulder.ibm.com/infocenter/ibmxiv/r2/topic/com.ibm.help.xiv.doc/docs/GA32-0638-03.pdf), GA32-0638

This document describes how to use the IBM XIV command-line interface (XCLI) to run XIV system and utility commands.

VSS Provider - Xprov

- *IBM XIV Storage System VSS Provider - Xprov Release Notes* (publib.boulder.ibm.com/infocenter/ibmxiv/r2/topic/com.ibm.help.xiv.doc/docs/xProv_2_2_3.pdf)

  This document describes the supported environment, new features, known issues, and installation information.

Remote Mirroring for VCS Cluster

- *IBM XIV Storage System Remote Mirroring for VCS Installation Guide* (publib.boulder.ibm.com/infocenter/ibmxiv/r2/topic/com.ibm.help.xiv.doc/docs/IBM_XIV_Remote_Mirroring_Agent_for_VCS_2.1.0_Installation_Guide.pdf)

  This guide describes how to install and configure the VERITAS Cluster Server (VCS) enterprise agent for IBM XIV Remote Mirroring.

- *IBM XIV Storage System Remote Mirroring for VCS Release Notes for Windows* (publib.boulder.ibm.com/infocenter/ibmxiv/r2/topic/com.ibm.help.xiv.doc/docs/IBM_XIV_Remote_Mirroring_Agent_for_VCS_2.1.0_Release_Notes_for_Windows.pdf)

  This document describes the supported environment, new features, fixes, and known issues.

- *IBM XIV Storage System Remote Mirroring for VCS Release Notes for Solaris* (publib.boulder.ibm.com/infocenter/ibmxiv/r2/topic/com.ibm.help.xiv.doc/docs/IBM_XIV_Remote_Mirroring_Agent_for_VCS_2.1.0_Release_Notes_for_Solaris.pdf)

  This document describes the supported environment, new features, fixes, and known issues.

MPIO Management Console

- *IBM XIV Storage System MPIO Management Console User's Guide* (publib.boulder.ibm.com/infocenter/ibmxiv/r2/topic/com.ibm.help.xiv.doc/docs/GA32-0795.pdf), GA32-0746

  This guide discusses the IBM XIV MPIO Management Console application, which provides monitoring and management capabilities to the multipath subsystems of the IBM XIV Storage System.

Remote Support Proxy

- *IBM XIV Storage System Remote Support Proxy Installation and User's Guide* (publib.boulder.ibm.com/infocenter/ibmxiv/r2/topic/com.ibm.help.xiv.doc/docs/GA32-0795.pdf), GA32-0795

  This guide describes how to install, configure, and use the IBM XIV Storage System Remote Support Proxy to connect an XIV system to the XIV Remote Support Center.

Management Console for VMware vCenter

- *IBM XIV Storage System Management Console for VMware vCenter User's Guide* (publib.boulder.ibm.com/infocenter/ibmxiv/r2/topic/com.ibm.help.xiv.doc/docs/GA32-0820-01.pdf), GA32-0820

This guide provides installation and configuration instructions for the IBM XIV Management Console for VMware vCenter.

IBM Redbooks publications and technical papers

Various IBM Redbooks® publications, Redpapers, and white papers are available for the IBM XIV Storage System. For additional papers, see the IBM XIV Storage System (www.ibm.com/systems/storage/disk/xiv/) website.

- *IBM XIV Storage System: Architecture, Implementation, and Usage* (www.redbooks.ibm.com/abstracts/sg247659.html?Open&cm_sp=MTE10970)

  This Redbooks publication describes the concepts, architecture, and implementation of the XIV system, which is designed to be a scalable enterprise storage system based upon a grid array of hardware components.

- *IBM XIV Storage System with the Virtual I/O Server and IBM i* (www.redbooks.ibm.com/abstracts/redp4598.html?Open&cm_sp=MTE11087)

  This paper discusses and explains how you can connect the XIV system to the IBM i operating system through the Virtual I/O Server (VIOS). A connection through the VIOS is especially useful for IT centers that have many small IBM i partitions. When using the VIOS, the fibre-channel host adapters can be installed in the VIOS and shared by many IBM i clients using virtual connectivity to the VIOS.

- *Performance Reinvented* (ftp://service.boulder.ibm.com/storage/disk/xiv/ibm_xiv_performance_paper.pdf)

  This white paper describes how the XIV system provides a solution to today's performance requirements.

- *Reliability Reinvented* (ftp://service.boulder.ibm.com/storage/disk/xiv/ibm_xiv_reliability_paper.pdf)

  This white paper describes how the XIV architecture delivers a new standard of reliability and availability for enterprise-class storage systems.

- *Snapshot Reinvented* (ftp://service.boulder.ibm.com/storage/disk/xiv/ibm_xiv_snapshots_paper.pdf)

  This white paper describes the XIV snapshot architecture and explains its underlying advantages in terms of performance, ease of use, flexibility and reliability. It also describes how these advantages are achieved by harnessing the power afforded by the unique grid architecture.

- *Thin Provisioning Reinvented* (ftp://service.boulder.ibm.com/storage/disk/xiv/ibm_xiv_thin_provisioning_paper.pdf)

  This white paper explores the benefits of thin provisioning, the XIV approach to implementing it, and other XIV capabilities that ease management and increase return on investment for IT managers and storage administrators.

Related websites

View these websites to get more information about the XIV system.

- IBM XIV Storage System (www.ibm.com/systems/storage/disk/xiv/)

  Use this website to learn about the XIV system, including features and hardware summary. This website also has links to white papers, Redbooks publications, and product documentation.

- IBM Support Portal (www.ibm.com/storage/support)

  Use this website to obtain downloadable files, links to submit and track problems, and support phone numbers and contacts.

- IBM Systems Storage forum (www.ibm.com/developerworks/forums/forum.jspa?forumID=846)

  Use this forum to share ideas with knowledgeable experts and discover how the latest IBM storage solutions can address your business challenges. Forum topics include storage management, storage virtualization, business continuity, infrastructure simplification, disk storage systems, and storage software products and solutions.

Getting information, help, and service

If you need help, service, technical assistance, or just want more information about IBM products, you can find a variety of sources to assist you. You can view the following websites to get information about IBM products and services and to find the latest technical information and support.

- IBM home page (ibm.com®)
- IBM Support Portal (www.ibm.com/storage/support)
- IBM Directory of Worldwide Contacts (www.ibm.com/planetwide)

Ordering publications

The IBM Publications Center is a worldwide central repository for IBM product publications and marketing material.

The IBM Publications Center (www.ibm.com/shop/publications/order/) offers customized search functions to help you find the publications that you need. Some publications are available for you to view or download at no charge. You can also order publications. The publications center displays prices in your local currency.

Sending your comments

Your feedback is important in helping to provide the most accurate and highest quality information.

Procedure

To submit any comments about this book or any other IBM XIV Storage System documentation:

- Go to the feedback form (publib.boulder.ibm.com/infocenter/ibmxiv/r2/topic/com.ibm.xiv.doc/icfeedback.htm) in the IBM XIV Storage System information center. You can use this form to enter and submit comments.
- Send your comments by email to starpubs@us.ibm.com. Be sure to include the following information:
  - Exact publication title and version
  - Publication form number (for example, GA32-0770-00)
  - Page, table, or illustration numbers that you are commenting on
  - A detailed description of any information that should be changed

Summary of changes

Use this information to learn about new features and enhancements in this guide.

The following list provides the current technical changes and enhancements to the IBM XIV Storage System as of January 13, 2011.

- Updated line cord and automatic transfer switch descriptions (see "Line cords" on page 11).
- Added the IBM contact and location fields to the Contact information worksheet (see "Contact information worksheets" on page 46).

The following list provides the current technical changes and enhancements to the IBM XIV Storage System as of December 17, 2010.

- Added information about the new radio frequency identification device (RFID) option (feature code 0203) that can be used to track equipment in your data center (see "Radio frequency identification device option" on page 31).
- Added the xiv_planning_worksheets.ods file that you can use to fill out the site checklist and installation worksheets (see Chapter 9, "Worksheets and checklists," on page 41). This information must be sent to the IBM service representative before installation can be performed.
- Made the following corrections and clarification in this guide:
  - Removed the management port connection table from the remote support worksheet (see "Remote support worksheets" on page 45).
  - Clarified that an IBM service representative is required to recover an XIV system that was turned off using a room EPO switch (see "Emergency power off considerations" on page 9).

The following list provides the current technical changes and enhancements to the IBM XIV Storage System as of September 9, 2010.

- Added support for a new active-active, three-phase, 30A automatic transfer switch (ATS) for United States, Canada, Latin America, and Asia/Pacific ("Line cords" on page 11)
- Added support for a new three phase, 30A line cord for non-EMEA and AP, with feature code 9824 (see "Line cords" on page 11)
- Removed information about single-phase, 30A line cords and Chicago-specifc line cords, including feature codes 9812, 9814, 9815, 9817, 9818, 9819, 9821 and 9823 (see "Line cords" on page 11). These feature codes are no longer orderable in new XIV system.
- Removed information about installing an XIV system with a four-line-cord configuration (see "Power sources" on page 10). This configuration requires feature cords 9814, 9815, 9817, 9818, or 9819, which are no longer orderable in new XIV system.
- Added information about the XIV Remote Support Proxy, which can be used to facilitate the connection to IBM when the XIV system does not have direct access to the Internet, for example, due to firewall (see "Remote access through the XIV Remote Support Center" on page 33)
- Made the following corrections and clarification in this guide:

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- Clarified that the line cord that gets energized first becomes the primary feed. You can use this characteristic to manually balance the power load among several different XIV system racks (see “Power sources” on page 10).
- Corrected the information about who to contact to discuss considerations if you chose to use the four 30 A single-phase configuration. The correct contact is IBM XIV technical sales or a technical advisor (see “Power sources” on page 10).
- Corrected the maximum transmission unit value. The maximum MTU is 4500 bytes (see “iSCSI network configuration” on page 28).
- Corrected the IP address used for remote support using a broadband connection. The correct IP address is 195.110.41.141 (see “Remote access by broadband connection” on page 35).
- Corrected the IP address used for remote support through the XIV Remote Support Center (see “Remote access through the XIV Remote Support Center” on page 33).
- Added detailed description of each port in the patch panel (see “Network connections” on page 6).
- Clarified that host systems must have the host attachment kit installed (see “Network connections” on page 6).
- Clarified that a maximum of 256 host ports can be concurrently logged in to each interface module (see “Network connections” on page 6 and “Rack configurations” on page 5).

Chapter 1. Overview

This planning information defines preinstallation requirements for the IBM XIV Storage System model A14. It is important to ensure that you meet all requirements to help achieve a fast and reliable installation.

Table 2 lists the machine types that are available for IBM XIV Storage System.

Table 2. Available hardware and warranty periods

Machine type	Warranty
2810	1-year warranty
2812	3-year warranty

Good planning is essential for the successful setup and use of your XIV system. It ensures that you have everything you need and that you have met all the prerequisites for the XIV system. It minimizes errors and helps installation go faster. Use this planning information to place the XIV system, plan power and environmental needs, and prepare for unique configurations based on how you plan to use the XIV system.

Several checklists and worksheets are provided. Use the checklists to prepare the site. Use the worksheets to record information that is needed by IBM installation planning representative (IPR) or an IBM service representative to install and configure the XIV system.

Attention: Customers must prepare their environments to handle the XIV system based on this planning information with assistance from an IBM installation planning representative (IPR) or an IBM service representative. The final installation site within the computer room must be prepared before the equipment is delivered. If this is not possible at the time of delivery, customers must make arrangements to have the professional movers return to finish the transportation at a later date. Only professional movers can transport the equipment. The IBM-authorized service provider performs only minimal frame repositioning within the computer room, as needed, to perform required service actions. Customers are also responsible for using professional movers in the case of equipment relocation or disposal.

This planning information supports systems shipped with dual-processor interface modules (feature code 1101). This feature is available on racks ordered after August 2009. XIV systems shipped with the interface modules (feature code 1100) that were ordered August 2009 or earlier differ slightly in weight, sound output, power consumption, and depth of the rack. If you are relocating or planning installation of a system ordered with feature code 1100, see Chapter 10, “Specifications (pre-August 2009 racks),” on page 51.

If you cannot meet any of the installation requirements, notify your IBM service representative to devise alternative solutions.

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Chapter 2. Rack configurations

Multiple rack configurations are supported, from a minimum of six modules to a maximum of 15 modules. A rack that contains 6 or 9 - 14 modules is considered a *partially populated* system, and a rack with 15 modules is considered a *fully populated* system.

Rack components

This information lists the components that are supplied with fully populated and partially populated racks for model A14.

The following components are supplied with all rack configurations:
- Three to nine data modules
- Three or six interface modules
- Three uninterruptible power supplies
- Two Ethernet switches
- One Ethernet switch redundant power supply
- One maintenance module
- One automatic transfer switch
- One modem
- Fibre Channel ports
- iSCSI ports (not supplied in six-module configurations)
- Complete set of internal cabling

IBM XIV Storage System supports racks that contain a total of six or nine to fifteen modules. Seven-module and eight-module configurations are not supported.

Each module contains twelve 1 TB or 2 TB Serial Advanced Technology Attachment (SATA) disk drive moduless (DDMs).

Important: You can order an XIV system with either 1 TB or 2 TB disk drives. You cannot order an XIV system with a mix of both 1 TB and 2 TB disk drives.

Partially populated configurations have the same power, floor planning, hardware, software, and cabling configurations as fully populated systems. In other words, partially populated racks are identical to fully populated racks, except that they have fewer modules and therefore less storage capacity.

For safety reasons, partially populated racks are always populated from the bottom towards the top.

Fully populated rack (15 modules)

A fully populated rack contains nine data modules and six interface modules for a total of 15 modules and 180 DDMs. This translates into a total usable capacity of 79 TB (180 TB raw) for 1 TB disk drives or total usable capacity of 161 TB (360 TB raw) for 2 TB disk drives.

Figure 1 on page 4 shows the front and rear views of a fully populated XIV system.

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Figure 1. Fully populated XIV system model A14 rack

Minimally populated rack (6 modules)

A minimally populated rack contains three data modules and three interface modules for a total of six modules and 72 DDMs. This translates into a total usable capacity of 27 TB (72 TB raw) for 1 TB disk drives or total usable capacity of 55 TB (144 TB raw) or 2 TB disk drives.

Figure 2 on page 5 shows the front and rear views of a minimally populated XIV system.

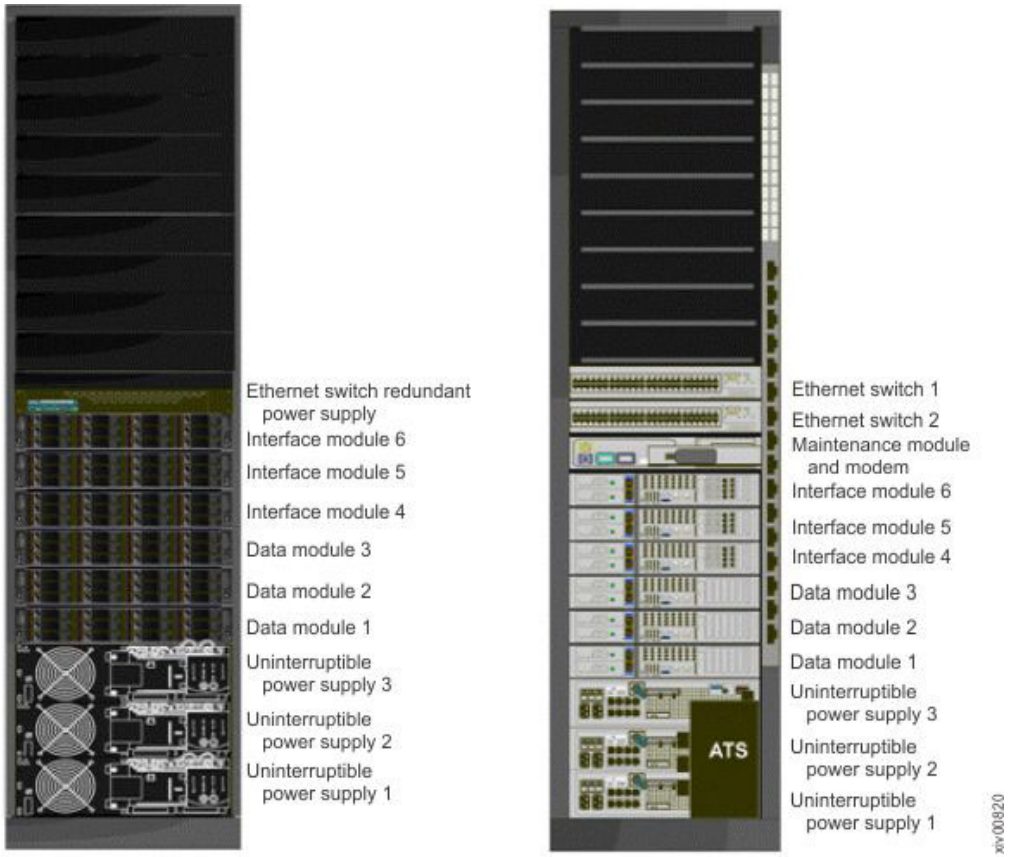


Figure 2. Partially populated XIV system model A14 rack

Rack configurations

This information provides a comparison of fully and partially populated rack configurations for model A14.

Table 3 provides a comparative summary of the modules in fully populated and partially populated racks. For usable capacity, the decimal is rounded down.

Note: Seven-module and eight-module configurations are not supported.

Table 3. Rack configurations comparison

Total modules	Number of interface modules	Number of data modules	Number of disk drives	Usable capacity for 1 TB disk drives (TB)	Usable capacity for 2 TB disk drives (TB)
6	3	3	72	27	55
9	6	3	108	43	87
10	6	4	120	50	102
11	6	5	132	54	111
12	6	6	144	61	125
13	6	7	156	66	134
14	6	8	168	73	149

Table 3. Rack configurations comparison (continued)

Total modules	Number of interface modules	Number of data modules	Number of disk drives	Usable capacity for 1 TB disk drives (TB)	Usable capacity for 2 TB disk drives (TB)
15	6	9	180	79	161

Table 4 lists the number of iSCSI and Fibre Channel ports per rack and identifies the interface modules that have Fibre Channel and iSCSI ports.

Table 4. Fibre Channel and iSCSI ports on interface modules

Total modules	Number of interface modules	Modules with iSCSI ports	Modules with fibre channel ports	Number of iSCSI ports	Number of fibre channel ports
6	3	None	4, 5	0	8 (See Notes 1, 2 and 3)
9	6	7, 8	4, 5, 7, 8	4	16 (See Notes 1, 2 and 3)
10	6	7, 8	4, 5, 7, 8	4	16 (See Notes 1, 2 and 3)
11	6	7, 8, 9	4, 5, 7, 8, 9	6	20 (See Note 1)
12	6	7, 8, 9	4, 5, 7, 8, 9	6	20 (See Note 1)
13	6	7, 8, 9	4, 5, 6, 7, 8, 9	6	24
14	6	7, 8, 9	4, 5, 6, 7, 8, 9	6	24
15	6	7, 8, 9	4, 5, 6, 7, 8, 9	6	24

Notes:

1. Fibre Channel ports on module 6 are not active in configurations of less than 13 modules.
2. Fibre Channel ports on module 9 are not active in configurations of less than 11 modules.
3. iSCSI ports on module 9 are not active in configurations of less than 11 modules.
4. A maximum of 256 host ports can be concurrently logged in to each interface module.

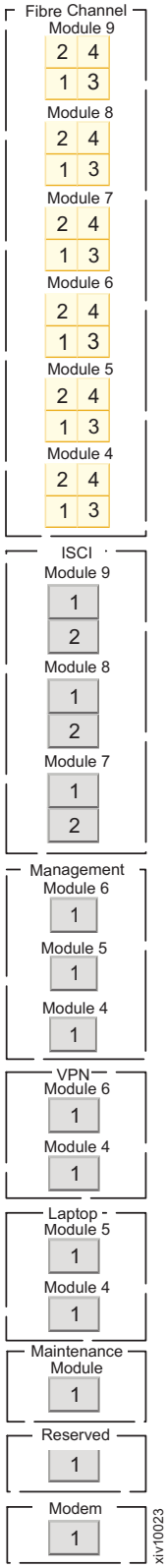
Network connections

This information describes the patch panel, which is used for network connectivity.

Table 5 on page 7 describes the ports and connections available in the patch panel. A simplified diagram of the path panel is shown on the left.

Important: The Ethernet port integrated into this product is not intended to be connected directly or indirectly, by any means whatsoever, to interfaces of public telecommunications networks.

Table 5. Patch panel connections

Patch panel	Patch panel port	Description
	**Host (data) connections**	Host systems are connected to the XIV system using Fibre Channel or iSCSI connections through the patch panel. The patch panel in turn is connected to the six interface modules (in a fully populated rack with 15 modules) For a six-module partially populated configuration: • There are eight Fibre Channel ports located on the three interface modules. • Only interface modules 4 and 5 can be used to connect to external hosts. • iSCSI connections are not available. **Note:** Always employ multipathing for data connections. If multipathing is not used, or there are problems in the customer environment on one path in the connection, a host connection error is shown if an interface module fails. In configurations with less than 11 modules, Fibre Channel and iSCSI interface ports are not enabled on module 9. In configurations with less than 13 modules, Fibre Channel interface ports are not enabled on module 6. A maximum of 256 host ports can be concurrently logged in to each interface module. **Important:** Host systems must have the host attachment kit installed.
	Management port	These three redundant ports are available to perform system management. These ports are connected through modules 4, 5, and 6. **Note:** Use all three connections for redundancy. If customers use only one path and the module for that connection goes down, the ability to manage the XIV system is lost.
	VPN port (remote support)	These two ports on the patch panel are used for network connection for remote support. These virtual private network (VPN) ports connect to modules 6 and 4. **Note:** To avoid losing remote support if one of the modules fails, connect to both VPN ports.
	Laptop port	These two ports on the patch panel are used to connect the XIV system directly to a notebook computer on which the GUI and XCLI are installed. **Important:** Use the laptop ports only for direct notebook-computer connections. Do *not* connect the laptop ports to the network. A Dynamic Host Configuration Protocol (DHCP) server is implemented over this port, and a connection to the network might cause incorrect IP address assignments to the host systems. The upper laptop port is connected to module 5, and the lower port is connected to module 4. If module 5 has failed or is being serviced, use the module 4 port; likewise, if module 4 has failed or is being serviced, use the module 5 port. **Important:** The laptop port must be used only by IBM service and support representatives. It is *not* intended for customer use.
	Maintenance module port	This port connects to the maintenance module.
	Modem port	This port connects to a modem for remote support.

Chapter 3. AC power requirements

This information describes the ac power requirements for machine types 2810 and 2812, including information about power configuration, power consumption, and power cabling scheme.

Power configuration

The IBM XIV Storage System contains three uninterruptible power supplies and redundant power cords that maintain power to the XIV system in the event of an ac power loss.

The three internal uninterruptible power supplies in the XIV system appear to the central uninterruptible power supply system in the main data center as standard modern storage-system power supplies. The XIV system does not impose any harmful characteristics to the central uninterruptible power supply in the main data center.

The XIV system has redundant power cords. For dual-power-cord options, you must supply power from two independent sources of electricity. Consult an IBM service representative to discuss power source options for the four power cord solution.

Note: Removing all ac power from the XIV system causes an emergency shutdown. All modified data is then saved to disks, and the XIV system turns off within 5 minutes.

Emergency power off considerations

The IBM XIV Storage System machine types 2810 and 2812 do not have an emergency power off (EPO) switch; however, you can connect the XIV system to a room EPO switch.

Note: National or local building, electrical, fire prevention, safety and/or other laws or regulations may address or control the manner in which information technology equipment is installed within certain facilities and environments. The application of those laws or regulations may depend on considerations of factors beyond the nature or design of the equipment to be installed. It is a customer responsibility to interpret and identify any laws or regulations applicable to the installation of information technology in its environment and to inform IBM, IBM Business Partners or their designated installers of any actions not identified in this planning guide that are necessary to install information technology equipment in the customer's facilities in accordance with such applicable laws or regulations.

A room EPO switch can be powered by the XIV system uninterruptible power supplies for use with non-powered switch circuit breakers. The EPO circuit in the uninterruptible power supplies is considered a Class 2 circuit (UL, CSA standards) and a safety extra-low voltage (SELV) circuit (IEC standard). Contact your IBM service representative for more information about connecting to a room EPO switch.

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Attention: Powering off the XIV system using a room EPO switch results in data loss and possible loss of configuration. An IBM service representative is required to recover an XIV system that was turned off using a room EPO switch. If the XIV system loses ac power but is not powered off using an EPO circuit, data and configuration are preserved.

Power sources

Several ac power source configurations are available.

- Two 60 A, 200-240 V ac, single-phase, two-pole, line-line ground female receptacles, each connected to a different power source
- Two 30 A, 200-240 V ac, three-phase receptacles, each connected to a different power source
- Two 60 A, 200-240 V ac, three-phase receptacles, each connected to a different power source

The IBM XIV Storage System is protected by an uninterruptible power supply for internal use; however, you can reduce the risk of a power outage by connecting the system to an external uninterruptible power supply, a backup generator, or both.

Provided that both power feeds into the XIV system racks have voltages within operational tolerance, the feed that gets energized first becomes the *primary feed*. You can use this characteristic of the XIV system rack to manually balance the power load among several XIV system racks. In case of a power feed failure, the automatic transfer switch (ATS) switches the power load to the remaining feed. When power is resumed, you must repeat the manual balancing operation.

If the three-phase, 30A ATS for non-EMEA (feature code 9894) is installed and both power feeds into the XIV system have voltages within the operational tolerance, the power load is shared across both power feeds. In the case of a power-feed failure, the ATS switches the full power load to the remaining feed.

Input voltages and frequencies

This information lists the voltages or frequencies that are accepted by the IBM XIV Storage System.

Table 6 provides the voltages and frequencies accepted by the IBM XIV Storage System.

Table 6. Input voltages and frequencies

Characteristics	Voltage or frequency
Nominal input voltages	200, 208, 220, or 240 V ac
Maximum input current	30 A or 60 A
Minimum input voltage	180 V ac
Maximum input voltage	264 V ac
Maximum ground-leakage current	50 mA
Steady-state input frequencies	50±3 Hz or 60±3 Hz
Power line disturbance (PLD) input frequencies	50±3 Hz or 60±3 Hz

Line cords

The IBM XIV Storage System is available in multiple line cord configurations. The automatic transfer switch (ATS) is chosen based on the line cords selected.

Attention: The regional designations are general. The ATS assigned to the regional designation might not be accurate for your country. If the input voltage for the country uses a wye circuit, use the appropriate ATS and line cords for EMEA (Europe, Middle East and Africa) and Asia/Pacific. If input voltage for the country uses a delta circuit, use the appropriate ATS and line cords for United States, Canada, Latin America.

Feature codes

The following table provides feature codes and descriptions for each available ATS. It also lists the feature codes for each of the line cords that are associated with that specific ATS.

Table 7. Automatic transfer switches

Automatic transfer switch feature code	Description	Feature codes for associated line cords
9890	ATS for worldwide use; single-phase, 60 A	9811 9813
9891	ATS for United States, Canada, Latin America, and Japan; three-phase, 60 A, delta	9820
9892	ATS for EMEA and Asia/Pacific (except Japan); three-phase, 30 A, wye	9822
9894	ATS for United States, Canada, Latin America, and Japan; three-phase, 30 A, delta	9824

The following table provides the feature codes and description details for each line cord.

Table 8. Line cords

Line cord feature code	ATS feature code	Description	Connector (See Note 1.)	Wall receptacle (See Note 1.)	Inline receptacle (See Note 1.)
9811	9890	Line cord for United States, Canada, Latin America, and Japan; single-phase, 60 A, two wires + ground with plug	Hubbell HBL360P6V04	Hubbell HBL360R6W	Hubbell HBL360C6W
9813	9890	Line cord for EMEA and Asia/Pacific (except Japan); single-phase, 60 A, two wires + ground, hard wired	Hard wired or uses client-provided connector	Not applicable	Not applicable
9820	9891	Line cord for United States, Canada, Latin America, and Japan; three-phase, 60 A, three wires + ground with plug	Hubbell HBL460P9V05	Hubbell HBL460R9W	Hubbell HBL460C9W

Table 8. Line cords (continued)

Line cord feature code	ATS feature code	Description	Connector (See Note 1.)	Wall receptacle (See Note 1.)	Inline receptacle (See Note 1.)
9822	9892	Line cord for EMEA and Asia/Pacific (except Japan); three-phase, 30 A, three wires + neutral + ground, hard wired	Hard wired or uses client-provided connector	Not applicable	Not applicable
9824	9894	Line cord for United States, Canada, Latin America, and Japan; three phase, 30A, three wires + ground with plug	Hubbell HBL430P9V04	Hubbell HBL430R9W	Hubbell HBL430C9W
Note: Line cords are provided with the connector part numbers shown. Receptacle part numbers shown are recommended. Although equivalent receptacles can be used, it is the responsibility of the customer to verify compatibility.					

Line cord considerations

The following information provides details to consider regarding line cords for IBM XIV Storage Systems:

- Line cords are 250 V/60 A or 250 V/30 A rated. Single-phase line cords have two poles and three wires. Three-phase line cords have three poles and four wires, or four poles and five wires. Plugs and receptacles for feature codes 9811 and 9820 are IEC309-compliant.
- Bulk wire conductor sizes for line-cord feature codes are:
  - 9811 and 9820: 6 AWG
  - 9813: 10 mm^2
  - 9822: 6mm^2
  - 9824: 10 AWG
- The line cords extend 4.1 m (13 ft 4 in.) when exiting from the top of the frame and 4.3 m (14 ft) when exiting from the bottom of the frame.
- Some feature codes have specific wall circuit-breaker requirements:
  - Single-phase installations (200 V - 240 V) with ATS feature code 9890 and two line cords require wall circuit breakers that have a rating of 60 A to 63 A.

    Attention: Do not exceed the wire rating of the facility.
  - Three-phase delta installations (200 V - 240 V) with ATS feature code 9891 require wall circuit breakers that have a rating of 50 A to 60 A. Do not exceed the wire rating of the facility.
  - Three-phase wye installations (220 V - 240 V) with ATS feature code 9892 require wall circuit breakers that have a rating of 30 A to 32 A. Do not exceed the wire rating of the facility.
  - Three-phase delta installations (200 V - 240 V) with ATS feature code 9894 require wall circuit breakers that have a rating of 30 A. Do not exceed the wire rating of the facility.

Power consumption

This information describes the power consumption for partial and full rack configurations.

Table 9 provides a complete power consumption listing for supported rack configurations for both 1 TB and 2 TB disk drives.

Table 9. Power consumption for partial and full rack configurations

Rack configuration	Number of modules (See Note 1.)	Idle kVA for 1 TB disk drives (Volt-Amps/1000)	High performance kVA for 1 TB disk drives (Volt-Amps/1000)	Idle kVA for 2 TB disk drives (Volt-Amps/1000)	High performance kVA for 2 TB disk drives (Volt-Amps/1000)
Full	15	7.2	8.4	6.2	7.1
Partial (See Note 2.)	14	6.7	7.8	5.9	6.6
	13	6.2	7.2	5.5	6.2
	12	5.7	6.7	5.1	5.8
	11	5.2	6.1	4.7	5.4
	10	4.7	5.5	4.4	4.9
	9	4.2	5.0	4.0	4.5
	6	2.9	3.4	2.8	3.1

Notes:

1. Seven-module and eight-module configurations are not supported.
2. The power consumption for partial-rack configurations is the typical value and is provided only for reference purposes. To support concurrent capacity upgrades, the installation site must provide sufficient power capacity to support high performance on a full rack configuration of 15 modules.

Distance from power source area

This information describes data that you must provide to your IBM service representative about the distance from the power source and the cabling scheme.

The IBM XIV Storage System supports both over-head and under-floor cabling configurations.

To prepare the power cords, you must provide your IBM service representative with the following information before the installation:

- The distance of the rack from the power receptacles.
- The ceiling or floor power-cabling scheme.

Chapter 4. Physical requirements

This information describes physical requirements for installing the IBM XIV Storage System.

Cooling and environmental considerations

This information provides considerations for cooling, air circulation and flow, and the operating environment.

Cooling requirements

Cooling (thermal dissipation) requirements are shown in Table 10.

Table 10. Thermal dissipation for partial and full rack configurations

Rack configuration	Number of modules (See Note 1.)	kBTU per hour for 1 TB disk drives	kBTU per hour for 2 TB disk drives
Full	15	28.5	24.1
Partial (See Note 2.)	14	26.6	22.6
	13	24.7	21.2
	12	22.8	19.7
	11	20.8	18.3
	10	18.9	16.9
	9	17.0	15.4
	6	11.7	10.6

Notes:

1. Seven-module and eight-module configurations are not supported.
2. The thermal dissipation for partial-rack configurations is the typical value and is provided only for reference purposes. To support concurrent capacity upgrades, the site must provide cooling arrangements to support a full-rack configuration.

Airflow

Airflow requirements are shown in Table 11.

Table 11. Airflow requirements for partial and full rack configurations

Rack configuration	Number of modules (See Note 1.)	Cubic feet per minute (CFM) for 1 TB disk drives (See Note 3.)	Cubic feet per minute (CFM) for 2 TB disk drives (See Note 3.)
Full	15	810	690

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Table 11. Airflow requirements for partial and full rack configurations (continued)

Rack configuration	Number of modules (See Note 1.)	Cubic feet per minute (CFM) for 1 TB disk drives (See Note 3.)	Cubic feet per minute (CFM) for 2 TB disk drives (See Note 3.)
Partial (See Note 2.)	14	760	640
	13	700	600
	12	650	560
	11	590	520
	10	530	480
	9	490	440
	6	330	300

Notes:

1. Seven-module and eight-module configurations are not supported.
2. The airflow for partial-rack configurations is the typical value and is provided only for reference purposes. To support concurrent capacity upgrades, the site must provide sufficient airflow space to support a full-rack configuration.
3. The airflow values assume a maximum inlet air temperature of 25°C (77°F).

Air circulation

Ensure that the following air circulation requirements are met:

- Cold air is provided from the front of the rack.
- Hot air is exhausted from the back of the rack.

Operating environment

Attention: Do not locate this system in an environment that is dusty or contains corrosive gases or metallic shavings such as zinc whiskers. See "Contamination information" for more information.

Ensure that the following air operating environment requirements are met:

- Temperature: 10 - 35° C (50 - 95° F)
- Relative humidity: 25% - 80%, non-condensing
- Maximum wet bulb temperature: 23° C (73.4° F)
- Maximum operating altitude: 2133 m (7000 ft)
- Acoustic output: Sound power, LwAu = 8.2 bels

Contamination information

You must consider the air quality and contamination levels at your installation site.

Airborne particulates (including metal flakes or particles) and reactive gases acting alone or in combination with other environmental factors, such as humidity or temperature, might pose a risk to the IBM XIV Storage System hardware. Risks that are posed by the presence of excessive particulate levels or concentrations of harmful gases include damage that might cause the XIV system to malfunction or cease functioning altogether. This specification describes limits for particulates and gases that are intended to avoid such damage. The limits must not be viewed or used as definitive limits because numerous other factors, such as temperature or

moisture content of the air, can influence the impact of particulates or environmental corrosives and gaseous contaminant transfer.

In the absence of specific limits, implement practices that maintain particulate or gas levels that are consistent with the protection of human health and safety. If IBM determines that the levels of particulates or gases in your environment have damaged the XIV system, IBM might require implementation of appropriate remedial measures to mitigate such environmental contamination before providing repair or replacement of the XIV system. Implementation of such remedial measures is a customer responsibility.

The following criteria must be met:

Gaseous contamination

Severity level G1 as per ANSI/ISA 71.04-1985[1], which states that the reactivity rate of copper coupons must be less than 300 Angstroms per month (Å/month, ≈ 0.0039 µ g/cm2-hour weight gain)[2]. In addition, the reactivity rate of silver coupons must be less than 300 Å/month (≈ 0.0035 µ g/cm2-hour weight gain)[3]. The reactive monitoring of gaseous corrosiveness must be conducted approximately 5 cm (2 in.) in front of the rack on the air inlet side at one-quarter and three-quarter frame height off the floor, or where the air velocity is much higher.

Particulate contamination

Data centers must meet the cleanliness level of ISO 14644-1 class 8. For data centers without air-side economizers, the ISO 14644-1 class 8 cleanliness can be met by choosing one of the following filtration methods:

- The room air can be continuously filtered with MERV 8 filters.
- Air entering a data center can be filtered with MERV 11 or preferably MERV 13 filters.

For data centers with air-side economizers, the choice of filters to achieve ISO class 8 cleanliness depends on the specific conditions present at that data center. The deliquescent relative humidity of the particulate contamination must be more than 60% RH[4]. Data centers must be free of zinc whiskers[5].

1. ANSI/ISA-71.04.1985. *Environmental conditions for process measurement and control systems: Airborne contaminants.* Instrument Society of America, Research Triangle Park, NC, 1985.
2. The derivation of the equivalence between the rate of copper corrosion product thickness growth in Å/month and the rate of weight gain assumes that Cu_2S and Cu_2O grow in equal proportions.
3. The derivation of the equivalence between the rate of silver corrosion product thickness growth in Å/month and the rate of weight gain assumes that Ag_2S is the only corrosion product.
4. The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote corrosion, ion migration, or both.
5. Surface debris is randomly collected from 10 areas of the data center on a 1.5 cm (0.6 in.) diameter disk of sticky, electrically conductive tape on a metal stub. If examination of the sticky tape in a scanning electron microscope reveals no zinc whiskers, the data center is considered free of zinc whiskers.

Physical space requirements

Use this information to learn about the physical space requirements for the IBM XIV Software System model A14, including rack dimensions and clearance.

Depending upon shipment dates, racks are supplied with one of the following front doors:

- Doors supplied with racks ordered with feature code 1100; see Chapter 10, "Specifications (pre-August 2009 racks)," on page 51 for the dimensions of racks ordered with feature code 1100.
- Doors supplied with racks ordered with feature code 1101 (door includes an IBM logo illuminated by an LED); Dimensions for IBM XIV Software System ordered with feature code 1101 are shown in Table 12.

Table 12. Rack dimensions and clearances

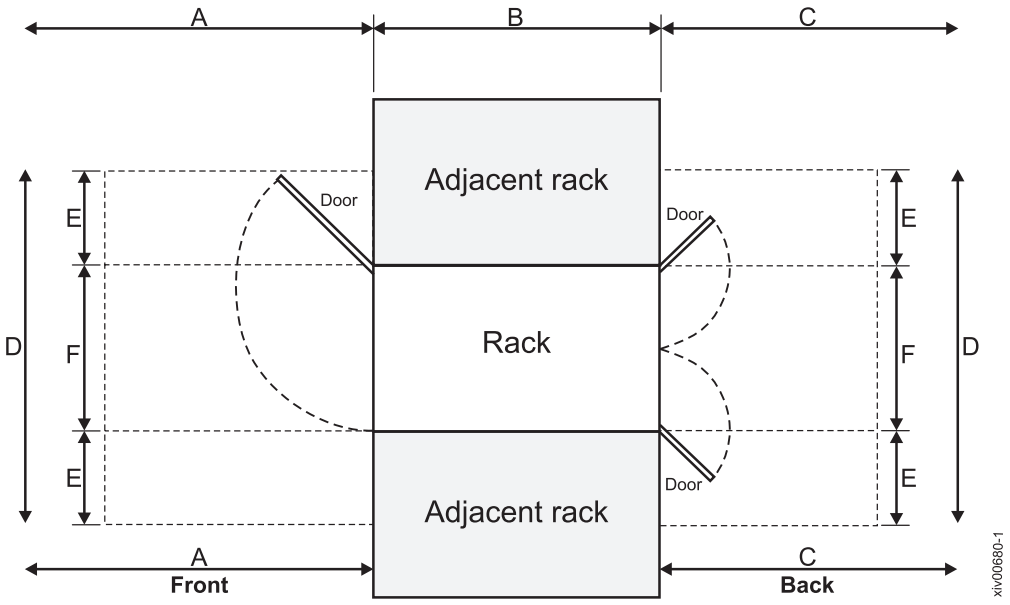
	Metric (mm)	**English (in.)**
General dimensions		
Height	1991	78.4
Width	600	23.6
Depth	1142	45.0
Clearances		
Front door	1200	47.2
Back door	1000	39.4
Service and cooling	See Figure 3 on page 19 for detailed information.	

Sides

You must adhere to the following space requirements around the sides of the racks:

- You must place racks no closer than 450 mm (17.7 in.) to a wall.
- You can position racks alongside (next to) other racks.
- Because several rack designs are available from IBM and other vendors, space between adjacent racks might be required to facilitate opening of the door for service. You must determine the space requirement at the time of installation.

IBM service representatives must have enough space to open the front and rear covers to service the unit, and must also be able to remove components and other assemblies from the unit. See Figure 3 on page 19 for minimum service clearances.



A 1200 mm (47.2 in.)
B 1142 mm (45.0 in.)
C 1000 mm (39.4 in.)
D 1500 mm (59.1 in.)
E 450 mm (17.7 in.)
F 600 mm (24.0 in.)

Figure 3. Top view of clearance requirements for service and cooling

Raised floor requirements

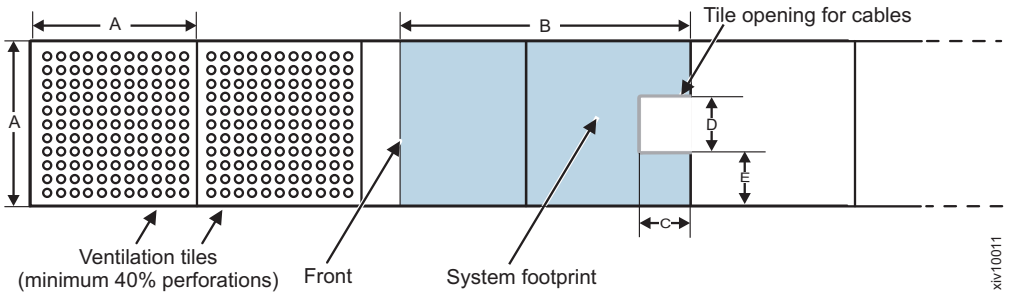
You can install the IBM XIV Storage System on either a raised or non-raised floor.

Note: A raised floor provides both better cabling support and helps to ensure more efficient cooling to the units.

When the system is placed on a raised floor with 60 cm × 60 cm (24 in. × 24 in.) tiles, use the following guidelines as shown in Figure 4 on page 20:

- Position the system on two tiles, with the front of the system aligned with the front tile.
- Make a 200 mm × 200 mm (8 in. × 8 in.) opening for cabling and electricity in the back tile, as shown in Figure 4 on page 20.

  Note: Place the opening under the system, centered on the back edge of the tile along the rear of the rack.
- To allow for ventilation for airflow and support system cooling requirements, have at least two tiles (and preferably more) in front of the system. These tiles must have a minimum of 40% perforation.



A 600 mm (24.0 in.)
B 1142 mm (45.0 in.)
C 200 mm (8.0 in.)
D 200 mm (8.0 in.)
E 200 mm (8.0 in.)

Figure 4. Raised floor requirements

Floor weight-support requirements

You must ensure that the floor load rating can support the weight of the IBM XIV Storage System.

Floor reinforcement must support a weight of 884 kg (1949 lb) on an area of 600 mm × 1092 mm (24 in. × 43 in.). These measurements are slightly less than the footprint area of the system, due to the overhang of the door. To ensure that all requirements are met, obtain the service of a qualified structural engineer to help prepare the floor.

Note: The same floor loading requirements apply to a partially populated rack that apply to a fully populated rack.

Important: If you do not know or are not certain about the floor load rating of the installation site, you must check with the building engineer or another appropriate person.

Physical network connection requirements

The environment must meet these physical network connectivity requirements.

The basic network requirements are:

- 50 µm (micrometer) multimode cables with LC connectors
- Cable requirements and cable positioning at the installation area are:
  - Straight copper gigabit CAT5e-rated cables with RJ-45 connectors for iSCSI and management
  - Straight copper CAT5e-rated cables with RJ-45 connectors for connecting to a virtual private network (VPN)
  - A minimum length of 3 m (10 ft) of Fibre Channel and Ethernet cables that are used for internal-cabinet cable wiring

For more details about network connectivity requirements, see Chapter 5, “Network requirements,” on page 25.

Delivery requirements

This information describes the standard delivery requirements and the shipping-weight reduction option.

Standard delivery requirements

Ensure that your site meets the following standard delivery requirements:

- A clear and level path from the truck to the building entrance
- No steps from the truck to the installation site
- Delivery clearances, shown in Table 13

Table 13 shows the typical pallet dimensions. These delivery clearance requirements are for all doors and elevators.

Table 13. Typical delivery clearance requirements

	Metric measurement (mm)	**English measurement (in.)**
Height (See Note.)	2120	87.0
Width	1016	40.0
Depth	1321	52.0
Note: These measurements are for the typical height of the pallet. These measurements do not include additional clearance needed to raise the pallet on a pallet jack for movement.		

Notes:

1. Coordinate a technical survey with IBM service representatives to plan the loading path from the truck to the server room.
2. If the height of the rack must be reduced for delivery to locations where doorway heights are smaller than the delivery clearances, remove the rack from the pallet and roll the rack on its castors only for a short distance. Removing the rack from the pallet reduces the delivery height to 1991 mm (78.4 in.).

Important: The rack is more easily moved when on a pallet and the rack casters might damage floors and carpets; therefore, roll the rack into position on its own casters only when necessary.

Disassembled shipping for weight reduction

If your site does not meet the delivery clearances shown in Table 13, IBM offers a disassembled shipping option (feature code 0200) that reduces the weight of the shipment for easier moving of components. The rack shipping weight is reduced to less than 300 kg by removing selected components that are shipped separately. This option reduces weight loading on floors and elevators used for moving the unit from the truck to the final position in the installation site. It also makes it easier to maneuver the rack through areas that do not meet the minimum space requirements. The IBM service representative installs the components that were shipped separately during the storage unit installation.

Note: This option greatly increases storage-unit installation time.

Related reference

"Delivery information worksheet" on page 42
Use this worksheet to record information about where the system is to be delivered.

Fibre Channel physical requirements

The IBM XIV Storage System is available in 6 and 9 - 15 module configurations.

The IBM XIV Storage System supports 50 µm (micrometer) fibers. If you require 62.5 µm fibers, contact an IBM service representative for assistance.

Table 14 summarizes the available rack configurations for Fibre Channel ports.

Table 14. Rack configurations for Fibre Channel ports

Total modules	Interface modules	Fibre Channel ports on modules	Number of Fibre Channel ports
6	3	4, 5	8
9	6	4, 5, 7, 8	16
10	6	4, 5, 7, 8	16
11	6	4, 5, 7, 8, 9	20
12	6	4, 5, 7, 8, 9	20
13	6	4, 5, 6, 7, 8, 9	24
14	6	4, 5, 6, 7, 8, 9	24
15	6	4, 5, 6, 7, 8, 9	24

Notes:

1. Seven-module and eight-module racks are not supported.
2. Fibre Channel ports on module 6 are not active in configurations with less than 13 modules.
3. Fibre Channel ports on module 9 are not active in configurations with less than 11 modules.

iSCSI physical requirements

iSCSI ports are available in XIV model A14 rack configurations with nine or more modules.

Table 15 summarizes the available rack configurations for iSCSI ports.

Table 15. Rack configurations for iSCSI ports

Total modules	Interface modules	iSCSI ports on modules	Number of iSCSI ports
6	3	None	0
9	6	7, 8	4
10	6	7, 8	4
11	6	7, 8, 9	6
12	6	7, 8, 9	6
13	6	7, 8, 9	6

Table 15. Rack configurations for iSCSI ports (continued)

Total modules	Interface modules	iSCSI ports on modules	Number of iSCSI ports
14	6	7, 8, 9	6
15	6	7, 8, 9	6

Notes:

1. Seven-module and eight-module racks are not supported.
2. iSCSI ports on module 9 are not active in configurations with less than 11 modules.

Chapter 5. Network requirements

This information describes Fibre Channel and iSCSI configurations, remote mirroring considerations, physical management ports, and laptop ports.

Fibre Channel logical network configuration

You can use a high availability configuration or a single switch configuration in your Fibre Channel network. Each interface module in the IBM XIV Storage System has four Fibre Channel ports.

Before you select a configuration, review the supported interoperability configurations on the System Storage Interoperation Center(www-03.ibm.com/systems/support/storage/config/ssic).

Restriction: You cannot attach a host directly to the IBM XIV Storage System.

High availability configuration

When possible, use a high availability configuration because this type of configuration maintains full connectivity in the event of a component failure.

The following points outline a high availability configuration:

- Each interface module is connected to two Fibre Channel switches.
- Each host is connected to two switches, using either two HBAs or a single HBA with two ports

If you use a high availability configuration, the following events occur to maintain full connectivity in the event of a component failure:

- If a switch fails, each host remains connected to all modules through a second switch.
- If a module fails, each host remains connected to the other two modules.
- If you replace a Fibre Channel switch or upgrade the software, the host remains connected to the IBM XIV Storage System.

Figure 5 on page 26 shows an example of a high availability configuration. Module 5 is connected to both switch A and switch B. Module 6 is connected to both switch A and switch B. Switch A and switch B are connected to all hosts.

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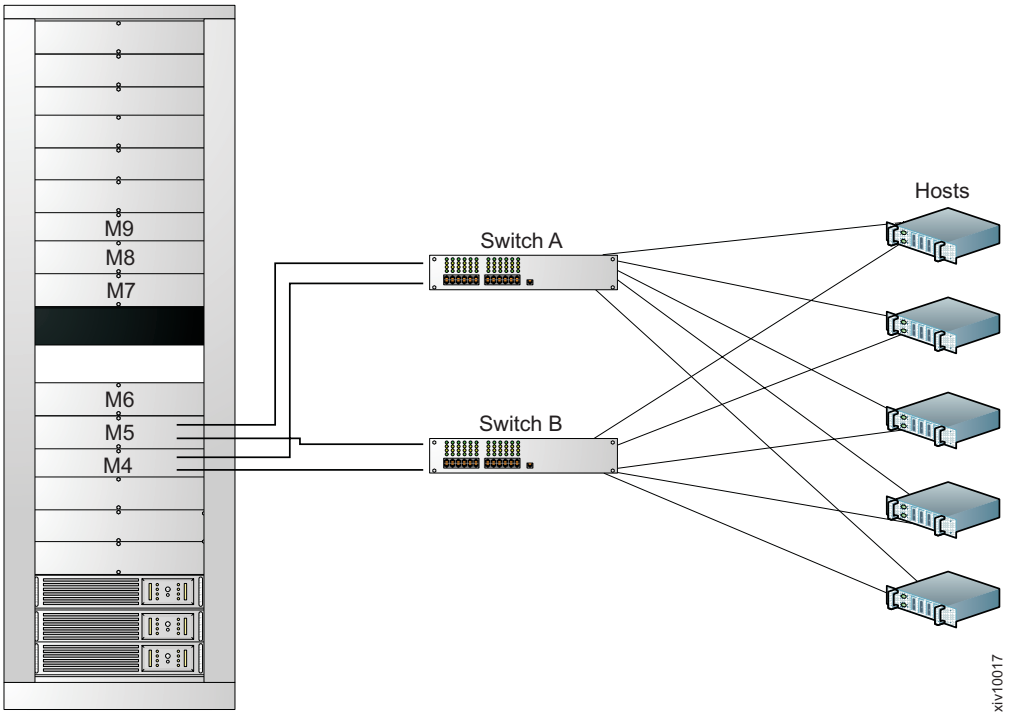

Figure 5. Example of a high-availability configuration

Single switch configuration

In a single switch configuration, the loss of a module does not impact the connectivity of other modules to the host. However, because there is only one switch, modules lose connectivity to the host if the switch fails. When possible, do not use this type of configuration.

The following points outline a high availability configuration:

- Each interface module is connected to a single Fibre Channel switch.
- Each host is connected to a single Fibre Channel switch.

Figure 6 on page 27 shows an example of a single switch configuration. Module 5 is connected to switch A. Module 6 is connected to switch A. Switch A is connected to all of the hosts.

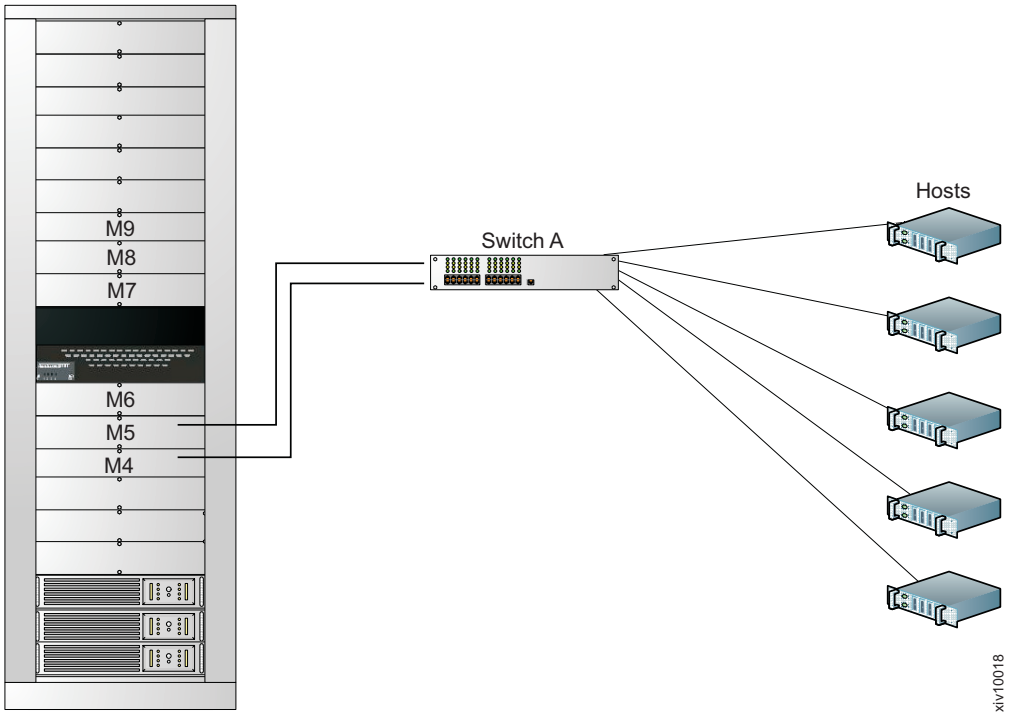

Figure 6. Example of a single-switch configuration

Related reference

"Fibre Channel worksheet" on page 48
Use this worksheet to record Fibre Channel information.

iSCSI logical network configuration

You can select from several options when deciding how to configure your logical network.

Before you select a configuration, review the supported interoperability configurations on the System Storage Interoperation Center(www-03.ibm.com/systems/support/storage/config/ssic).

Restriction: You cannot attach a host directly to the IBM XIV Storage System.

The following configurations can be used:

High availability configuration
Each module is connected through two ports to two different Ethernet switches and each host is connected to the two switches. Full connectivity is maintained in the event of a component failure. This configuration is the same as the high availability configuration option for Fibre Channel networks.

Single switch configuration
A single switch interconnects all modules and hosts. This configuration is the same as the single switch configuration option for Fibre Channel networks.

Single port host configuration
Each host is connected to a single switch and a switch is connected to two modules.

Related reference

"iSCSI worksheet" on page 49
Use this worksheet to record iSCSI information.

iSCSI network configuration

You must gather the necessary information for the iSCSI network before you start the configuration process.

Before you set up the iSCSI network, gather the following information for each iSCSI port:

- IP address
- Net mask
- Maximum transmission unit (MTU)
- Default gateway

Notes:

1. MTU configuration is required if the network supports an MTU that is larger than the standard one. Specify the largest possible MTU. The maximum MTU value is 4500 bytes.
2. Because the IBM XIV Storage System acts as a TCP server for iSCSI connections, packets are always routed through the Ethernet port from which the iSCSI connection was initiated. The default gateways are required only if the hosts do not reside on the same layer-2 subnet as the XIV system.

IP network configuration must be ready to ensure connectivity between the XIV system and the host, and must comply with the following requirements:

- If required, Ethernet VLANs must be configured correctly to enable access between the hosts and the XIV system.
- If present, IP routers must be configured correctly to enable access between the hosts and the XIV system.

Related reference

"iSCSI worksheet" on page 49
Use this worksheet to record iSCSI information.

Mixed iSCSI and Fibre Channel host access

Do not mix iSCSI and Fibre Channel host access. If your situation requires you to temporarily mix iSCSI and Fibre Channel host access to migrate data, you must plan carefully to avoid data loss.

Notes:

1. Not all hosts support multipath configuration between the protocols.
2. Fibre Channel ports on module 6 are not active in configurations with less than 13 modules.
3. Fibre Channel ports on module 9 are not active in configurations with less than 11 modules.
4. iSCSI ports on module 9 are not active in configurations with less than 11 modules.
5. iSCSI ports are available in rack configurations with nine or more modules.

Remote mirroring network configuration

Contact an IBM service representative for assistance with planning remote mirroring connectivity to ensure maximum resilience and to avoid connection failures.

Management ports

The IBM XIV Storage System is managed through three IP addresses over Ethernet interfaces to be resilient against hardware failures.

To be resilient to a single network failure, connect these ports to two different switches. Also, ensure that the network equipment that provides management communication is protected by an uninterruptible power supply.

IP configuration

For each of the three management ports, provide the following information to an IBM service representative before the installation is started:
- IP address of the port
- Net mask
- Default IP gateway

In addition, provide the following system-level IP information:
- IP address of the primary and secondary DNS servers
- IP address or DNS names of the SNMP manager, if required
- IP addresses or DNS names of the SMTP servers

Protocols

The IBM XIV Storage System is managed through dedicated management ports that are running TCP/IP over an Ethernet connection. Management is carried out through the following protocols:

- Proprietary protocols are used to manage the IBM XIV Storage System from the IBM XIV Storage Management GUI and IBM XIV command-line interface (XCLI). This management communication is performed over TCP port 7778. The XIV GUI and XCLI act as the client and initiate the connection. The IBM XIV Storage System acts as the server.
- The IBM XIV Storage System responds to SNMP packets when sending traps to SNMP managers.
- The IBM XIV Storage System initiates SNMP packets when sending traps to SNMP managers.
- The IBM XIV Storage System initiates SMTP traffic when sending e-mails for either event notifications or for SMS gateways. SMTP connections use port 25.
- The XIV GUI and XCLI communication is Secure Sockets Layer (SSL) encrypted, which provides security for passwords and various information.
- The management ports must be on a different subnet than the VPN ports that are used for remote access.

Laptop port

The IBM XIV Storage System has two Ethernet laptop ports that are only to be used by IBM service representatives.

A single laptop or computer can be connected to these ports.

Attention: Do not connect these ports to the network. You must use these ports only to directly connect to a service laptop. A Dynamic Host Configuration Protocol (DHCP) server is implemented over this port and a connection to the network might cause an incorrect IP address to be assigned to hosts.

Chapter 6. Delivery and rack options

This information describes the delivery and rack options for IBM XIV Storage System model A14.

Table 16 lists features that are available for XIV model A14.

Table 16. Delivery and rack options

Feature code	Feature description
0200	Weight reduction for shipping
0203	Radio frequency identification device tag

Weight reduced shipping option

This information describes the weight reduction option for shipping IBM XIV Storage System model A14.

IBM offers a disassembled shipping option (feature code 0200) that reduces the weight of the shipment for easier movement of components. The XIV model A14 rack shipping weight is reduced to less than 300 kg by removing selected components that are shipped separately. This option reduces weight loading on floors and elevators used for moving the unit from the truck to the final position in the installation site. It also makes it easier to maneuver the rack through areas that do not meet the minimum space requirements. The IBM service representative installs the components that were shipped separately during the storage unit installation.

Each module with all disk drive modules installed weights 28.6 kg (69.9 lb).

Note: This option greatly increases storage-unit installation time.

Radio frequency identification device option

IBM offers a radio frequency identification device (RFID) option (feature code 0203) for the IBM XIV Storage System.

If you use RFID technology to track equipment in your data centers, you can order the RFID option to attach an RFID tag on an XIV system. This RFID is designed to meet the performance and numbering specification as outlined by the radio frequency identification specifications. For information about the specification, see the Financial Services Technology Consortium (www.fstc.org/projects/index.php?id=29) website.

Important: This option is applicable only in environments that can use the correct RFID reading technology. Before ordering this option, review the RFID capabilities with your IBM service representative.

When this option is ordered, IBM attaches one RFID per rack. Order one RFID option for each XIV system that you want to track. This option does not tag individual components.

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This option can be ordered only when a new rack is ordered. The RFID option cannot be ordered as a miscellaneous equipment specification (MES).

Important: In the event that the tag needs to be replaced for an XIV system, ensure that you update the asset-management database with the new RFID number for that XIV system.

Chapter 7. Remote support and call home

This information describes what you need to know to plan for remote support and call home connections.

Remote support connections

IBM authorized personnel use remote support connections to perform real-time problem analysis and isolation.

Remote access is supported using one of the following three methods:

- A network connection to the Remote Support Center using one of the VPN ports or management ports. This is the preferred remote support method.
- A dedicated Ethernet connection to one or both of the VPN ports.
- A direct connection using the modem feature code 9101.

The security features differ among these methods, including the direction of the connection.

Related reference

"Remote support worksheets" on page 45
Use these worksheets to record connectivity information that is required by IBM service representatives to remotely connect to the XIV system to provide support.

"Contact information worksheets" on page 46
Use these worksheets to record customer support information.

Remote access through the XIV Remote Support Center

The IBM XIV Remote Support Center is a management system used by skilled IBM service representatives to provide remote support and problem-determination assistance over a secure network interface, either before or after parts are called out by the internal diagnostics of the IBM XIV Storage System. When using this method for remote support, the network connection to the XIV Remote Support Center is through one of the VPN or management ports.

Important: This is the preferred method for obtaining remote support.

The XIV Remote Support Center provides a high level of security for remotely supported XIV systems through encryption, authentication, authorization, auditing, and field-proven security components.

The XIV Remote Support Center has three components:

- The *XIV remote support client* is software that resides in the XIV system and handles remote support connectivity. It relies on a single outgoing TCP connection and is not able to receive inbound connections of any kind. The XIV remote support client is controlled using the IBM XIV command-line interface (XCLI) and starts a connection, terminates a connection (due to timeout or customer request), and attempts to reconnect when the connection is terminated unexpectedly.
- The *front servers* serve as a hub at which the XIV systems and the remote-support back server connect. The front servers are located on an IBM DMZ and receive and maintain connections from the XIV remote support client

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and the back server. The front servers are strictly inbound and do not initiate any outbound communication. No sensitive information is stored on the front server, and all data passing through the front server from the client to the back server is encrypted, so the front server or a malicious entity in control of a front server cannot access this data.

- One or more *back servers* are located within the IBM intranet. Only IBM service representatives that are authorized to perform remote support of XIV systems can access these servers. The back server authenticates the IBM service representative, provides the IBM service representative with a user interface through which to choose a system to support, and manages the remote support session as it progresses. The IBM service representative connects to the back server using an Secure Shell (SSH) client or an HTTPS connection with any browser.

Requirement: To perform remote support through the Remote Support Center, the XIV system must be able to initiate an outbound SSH connection to IBM. If the XIV system does not have direct access to the Internet (for example, due to a firewall), you can use the XIV Remote Support Proxy to facilitate the connection to IBM. For more information, see the *IBM XIV Storage System Remote Support Proxy Installation and User's Guide*.

The following figure illustrates the remote support components.

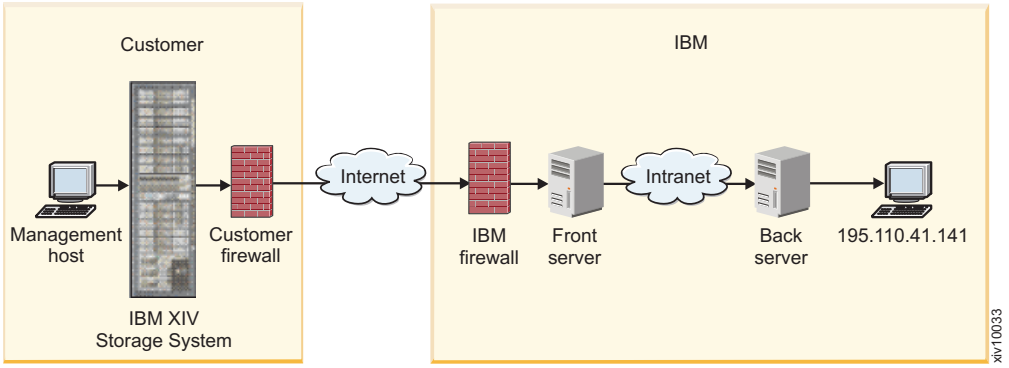

Figure 7. Remote support components

The XIV Remote Support Center uses the Secure Shell (SSH) protocol for transporting data. The encryption used by SSH provides confidentiality and integrity of the transferred data even over insecure mediums.

To conduct a remote support session, the IBM service representative must explicitly connect to the XIV Remote Support Center back server. The following secure remote connection process occurs when a support session is opened:

1. The customer initiates an Internet SSH connection to the XIV Remote Support Center.
2. The XIV Remote Support Center identifies the XIV system and marks it as connected.
3. The IBM service representative connects to the XIV Remote Support Center using SSH.
4. The XIV Remote Support Center authenticates the IBM service representative.
5. The IBM service representative is shown a list of currently connected XIV systems that correspond with the defined permissions, or the IBM service representative manually enters the serial number to view the XIV system.

6. The IBM service representative chooses the XIV system to support. Only permitted XIV systems are displayed, and all activity is logged.
7. The fully recorded support session commences.
8. The IBM service representative terminates the support session.
9. The XIV system disconnects from the XIV Remote Support Center.

While a support session is in progress, the XIV system generates events and displays the system status on the IBM XIV Storage Management GUI. You can view the process of phasing out a module or the restart of customer-visible system services as it happens. The customer has full control over whether to proceed with a support session using mechanisms such as timeout or force-disconnect. If a session disconnects unexpectedly, the IBM service representative can resume the session when the XIV system next connects to the Remote Support Center.

Remote access by broadband connection

To use a broadband connection for remote access, the network connection must be made to the VPN port connections on the patch panel.

Connect the VPN ports through your firewall so that an IBM service representative can access the IBM XIV Storage System, if required. You can limit access to be from only the IBM XIV IP address space. You can also configure a VPN between the IBM XIV support site and your firewall, so that the port can only be accessed through the defined VPN. The IBM XIV Storage System only accepts connections on server port 22. When using this method for remote access, the IBM XIV Storage System does not use these ports for outgoing IP traffic.

You must provide the following configuration information for the remote access port:

- IP address of the remote access (VPN) ports

  Important: VPN1 and VPN2 ports must be members of the same subnet.
- Network mask
- Default gateway
- External IP address that an IBM service representative can use to connect to the IBM XIV Storage System

Figure 8 on page 36 shows the remote support connectivity using a broadband connection.

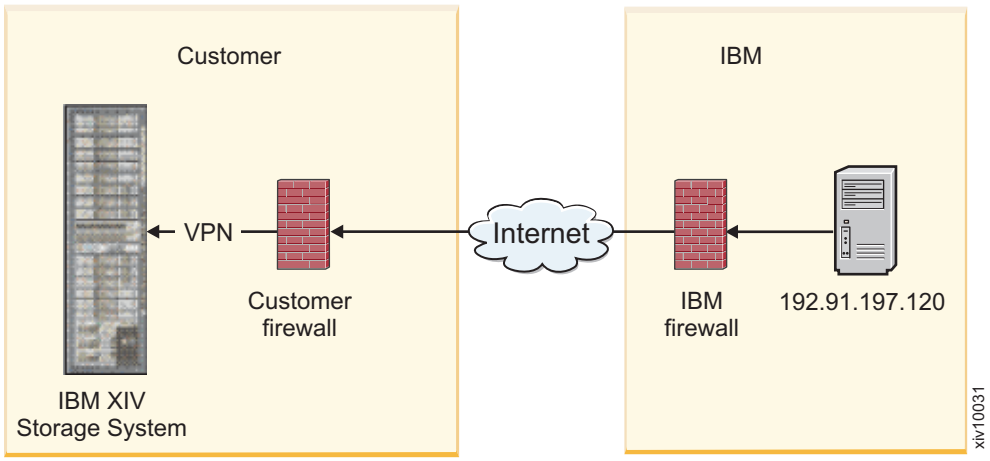

Figure 8. Remote support connectivity by broadband connection

Requirements: To access the XIV system from a broadband connection over Secure Shell (SSH), open a port that allows incoming traffic from IP address `192.91.197.120`. To access the XIV system over SSH, open port `22`. To access the XIV system from the GUI or XCLI, open port `7778` as well.

Remote access by modem

To use the modem for remote access, you must connect a telephone line to the modem and give the telephone number to IBM. The IBM XIV Storage System does not make outgoing calls using the modem so the telephone does not need to support dialing out.

Ensure that you use the correct connector for your country to enable dialing in. For example, in Germany and Luxembourg, use N-coded connectors.

Requirement: To access remote support through a modem, the customer must provide a phone line that supports dial in.

Figure 8 illustrates the remote support connectivity using a modem.

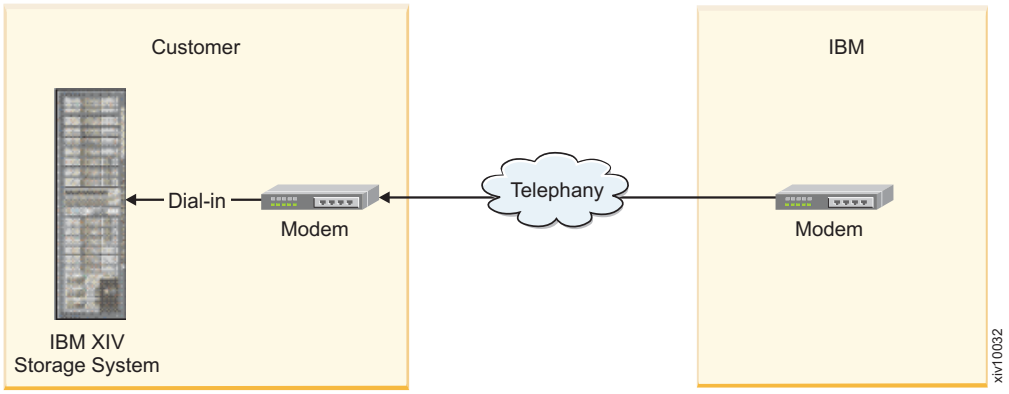

Figure 9. Remote support connectivity by modem

Call home configuration

The IBM XIV call home function connects your system directly to the IBM Trouble Ticketing System. The call home function enables both failure and pre-failure notifications to be automatically sent to the IBM Service Center.

When you enable the call home function, the IBM XIV Storage System sends an electronic call home record to the IBM Service Center when there is a problem with the system. If a problem requires service, an IBM service representative is sent to your site with any necessary replacement parts. Figure 8 on page 36 shows call home routing.

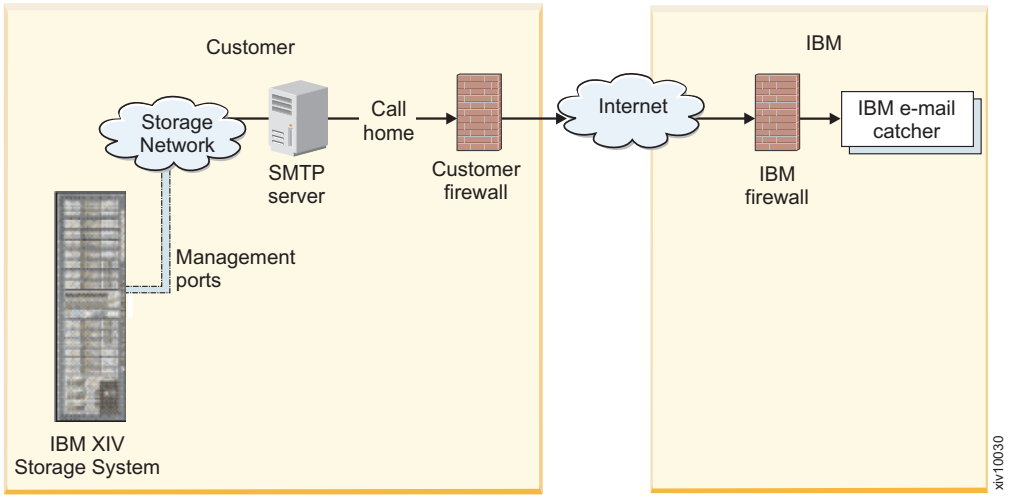

Figure 10. Call home routing

Call home alerts are sent through e-mail from your SMTP server. The XIV system must be configured to use an external SMTP server and be enabled to send messages to IBM through this server. The call home function is typically configured when the XIV system is first installed.

Table 17 lists requirements that must be met to configure the call home function.

Table 17. Call home configuration information

Call home configuration requirement	**Value**	**Comment**
Customer SMTP port	25	The customer SMTP server must be reachable on port 25 from the customer-provided management IP address.
Customer SMTP address	IP address	This IP address is supplied by the customer.

Table 17. Call home configuration information (continued)

Call home configuration requirement	Value	Comment
E-mail destination address	xiv-callhome-eastern-hemisphere@vnet.ibm.com or xiv-callhome-western-hemisphere@vnet.ibm.com	Customer SMTP server must allow relaying to the following IBM e-mail addresses based on geographical location: • East: EMEA, Asia, Australia, Africa, and the rest of the world • West: USA, Canada, Latin America, and the Caribbean Islands
E-mail source address	xiv@il.ibm.com or customer-defined	The default e-mail address from which the e-mail is sent. This e-mail address can be customer-defined to conform to the customer e-mail relay rules.

Important: It is a customer responsibility to configure the SMTP e-mail system to enable the XIV system to send outgoing e-mails for the call home function. The e-mail configuration rules must not inhibit call home e-mails from being sent in real time. E-mails with "Importance" or "X-Priority" in the e-mail header must not be delayed. For example, XIV e-mails must not be placed in a queue for later delivery or filtered for priority. The administrator must verify correct configuration and function of the e-mail system before installation. Failure to do this might delay the successful installation of the XIV system.

Chapter 8. Management platform requirements and installation

The IBM XIV Storage System provides a set of management tools, including the IBM XIV Storage Management GUI (XIV GUI), the IBM XIV online monitoring tool (XIVTop) and the IBM XIV command-line interface (XCLI). You can use these management tools to configure and monitor your IBM XIV Storage Systems. This information describes the hardware and software requirements and installation procedures for these management tools.

Management platform requirements

These requirements are necessary to install the IBM XIV Storage Management GUI.

Table 18 lists the supported operating systems and the processor level required for each operating system.

Table 18. Operating system and processor requirements for the IBM XIV Storage Management GUI

Operating system	Processor
Microsoft Windows 2000, Windows ME, Windows XP, Windows Server 2003, Windows Vista, ,Windows 2008, Windows 7	Intel Pentium Dual Core or equivalent, 32-bit or 64 -bit
Red Hat Linux version 5.0 or above	x86 or x64
SUSE Linux Enterprise Server 10 or 11	x86 or x64
IBM AIX® 5.3, IBM AIX 6.1	IBM PowerPC®
Solaris 9, Solaris 10	SPARC or x64
HP-UX 11i v2, HP-UX 11i v3	PA-RISC or Intel Itanium 64-bit

You must also satisfy the following additional requirements before installing the IBM XIV Storage Management GUI:

- A hard disk drive with at least 100 MB of available free space
- A minimum of 512 MB of memory (1 GB or more of memory is recommended)
- A monitor with a minimum resolution of 1024 × 768 (or a resolution within 1024 × 768 - 1920 × 1200)
- A color monitor with at least 24/32 true color (recommended)

Installing the IBM XIV Storage System management tools

This information describes how to download and install the IBM XIV management tools, including the IBM XIV Storage Management GUI (XIVGUI), the IBM XIV online monitoring tool (XIVTop), and the IBM XIV command-line interface (XCLI) for all supported platforms.

About this task

Note: For the installation requirements and a list of available packages, see the *Release Notes* on the IBM Support Portal (www.ibm.com/storage/support) website.

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The XIVGUI automatically checks for updates upon startup if Internet access is available. If the latest version is not installed, you are prompted to download and install the latest version.

Procedure

Perform these steps to download and install the IBM XIV management tools:

1. Download the IBM XIV Management Tools installation package and *Release Notes* from the IBM Support Portal (www.ibm.com/storage/support) website.
2. Perform one of the following procedures for your operating system.
   - **Windows:** Double-click the installation file, and follow the instructions on the screen.

     On the Select Components page in the installation wizard, you can choose which XIV management tools to install:

     Full installation
     Installs the IBM XIV Storage Management GUI, IBM XIV online monitoring tool (XIVTop) and IBM XIV command-line interface (XCLI).

     CLI installation
     Installs only the XCLI.
   - **Linux:** Extract the installation file to a designated folder on your system, using the following command:

     ```
     tar -xzf file_name.tar
     ```
   - **AIX, HP-UX, Solaris:** Extract the installation file using the following command:

     ```
     gunzip file_name.tar.gz
     ```

     Then, extract the file to a designated folder on your system, using the following command:

     ```
     tar -xvf file_name.tar
     ```

     Tip: You can download the GNU Unzip utility (**gunzip**) from the GZIP (www.gzip.org/) website.
3. Optional: Add the installation directory to your `PATH` environment variable.

Chapter 9. Worksheets and checklists

Use these worksheets and checklists to set up the site and record information that is need to configure the IBM XIV Storage System.

Site survey checklist

Use this checklist to help ensure that your installation site meets all requirements and to identify any problem areas.

Power

__ Power requirements are met for your configuration (see "Power consumption" on page 12 or "Power consumption (pre-August 2009 racks)" on page 51).

__ Each female socket provides a current of at least 60 A, 200-240 V ac (60 A configurations only)

__ Each female socket provides a current of at least 30 A, 200-240 V ac (30 A configurations only)

__ Distance between rack and power receptacles is: _____ (Specify the unit: m or ft)

__ Circle one of the following options: Ceiling power feed or Floor power feed

Cooling and environmental

Thermal dissipation

__ Thermal dissipation requirements are met for your configuration (see "Cooling and environmental considerations" on page 15 or "Cooling and environmental considerations (pre-August 2009 model A14 racks)" on page 51).

Air circulation

__ Cold air is provided to the front of the rack

__ Hot air exhausted from the rear of the rack

Airflow

__ Airflow requirements are met for your configuration (see "Cooling and environmental considerations" on page 15 or "Cooling and environmental considerations (pre-August 2009 model A14 racks)" on page 51).

__ Operating environment temperature 10° - 35° C (50° - 95° F)

__ Maximum wet bulb temperature: 23° C (73.4° F)

__ Relative humidity 25% - 80%, noncondensing

__ Altitude is less than 2133 m (7000 ft)

Environment

__ Dust free

__ Contains no corrosive gases

__ Contains no metallic shavings, such as zinc whiskers

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Physical space

__ 1991 mm (78.3 in.) height is available
__ 600 mm (23.6 in.) width is available
__ 1142 mm (45.0 in.) depth is available
__ 1200 mm (47.2 in.) front door clearance is available
__ 1000 mm (39.4 in.) back door clearance is available
__ 450 mm (17.7 in.) clearance from walls to side is available

For racks that were manufactured before August 2009, see "Physical space, weight, and acoustics (pre-August 2009 racks)" on page 54 for physical space information.

Raised floor

__ 200 mm × 200 mm (8 in. × 8 in.) opening in the back tile is ready.
__ Two ventilation tiles are ready.

Weight

__ Floor reinforcement strength to support a weight of 884 kg (1949 lb) reviewed and approved by the structural engineer. If the system is shipped with the disassembled shipping option (weight reduction) the floor delivery path needs to support only 300 kg (661.4 lb). However, the floor reinforcement strength remains the same as previously indicated.
__ Floor support area: 600 mm × 1092 mm (24 in. × 43 in.)

Delivery

__ A clear and level path from the truck to the building entrance
__ No steps from the truck to the equipment room
__ All doors and elevators have at least a 2210 mm (87 in.) height clearance
__ All doors and elevators have at least a 1016 mm (40 in.) width clearance
__ All doors and elevators have at least a 1321 mm (52 in.) depth clearance

Access approval requirements

__ Prearranged access approval obtained for IBM service representatives
__ Prearranged access approval obtained for movers
__ Prearranged access approval obtained for vehicles
__ Prearranged access approval obtained for the laptop or computer

Related information

Chapter 4, "Physical requirements," on page 15
This information describes physical requirements for installing the IBM XIV Storage System.

Delivery information worksheet

Use this worksheet to record information about where the system is to be delivered.

Table 19. Delivery address information entry worksheet

Description	Information
Company name:	
Department or division name:	

Table 19. Delivery address information entry worksheet (continued)

Description	Information
Street number and name:	
City or province:	
State:	
Zip code or postal code:	
Country:	
Country code - telephone number:	
Fax:	

Related concepts

"Delivery requirements" on page 21
This information describes the standard delivery requirements and the shipping-weight reduction option.

XIV system information worksheets

Use these worksheets to record information about the XIV system, including the system name, type, management IP addresses, domain name space (DNS) and time.

XIV system

Fill in the following worksheet to provide information about the XIV system..

Table 20. XIV system information worksheet

Field	Description	Information
System name	Descriptive name of the XIV system.	
System type	System type associated with the installed license agreement and level of support that the XIV system can receive. Specify either 2810 or 2812.	

Management IP access

Table 21. Management IP access worksheet

Module number	IP address	Netmask IP address	Default IP gateway
4			
5			
6			

Domain name space

Fill in the following worksheet to provide configuration information about the domain name space (DNS)

Table 22. Domain name space worksheet

Field	Description	Information
Primary DNS	Primary DNS server	
Secondary DNS	Secondary DNS server (optional)	

Time

Fill in the following worksheet to provide configuration information about the time zone and network time protocol (NTP) server

Table 23. Time worksheet

Field	Description	Information
Time zone	Time zone where the XIV system is installed.	
NTP server	IP address of the NTP server	

Related reference

"Management ports" on page 29
The IBM XIV Storage System is managed through three IP addresses over Ethernet interfaces to be resilient against hardware failures.

Call home worksheet

Use these worksheets to record information about call home.

Call home connects the XIV system directly to the IBM Trouble Ticketing System. The call home function sends notifications automatically to the IBM XIV Service Center when there is a problem with the XIV system. If a problem requires service, an IBM service representative is sent to the customer site with any necessary replacement parts.

Call home does not allow access to customer-stored data in the XIV system.

Important: It is a customer responsibility to configure the Simple Mail Transfer Protocol (SMTP) email system to enable the XIV system to send outgoing emails for the call home function. The email configuration rules must not inhibit call home emails from being sent in real time. Emails with "Importance" or "Priority" in the email header must not be delayed. For example, XIV emails must not be placed in a queue for later delivery or filtered for priority. The administrator is required to verify correct configuration and function of the email system before installation.

Fill in the following worksheet to provide configuration information for call home.

Table 24. Call home worksheet

Field	Description	Information
Hemisphere	Hemisphere from which the call home notification is sent. Specify either Western or Eastern.	

Table 24. Call home worksheet (continued)

Field	Description	Information
From address	Email address from which the call home notification is sent (for example, fromxiv@ibm.il.com). Customer exchange policies might prevent sending email that does not contain the customer domain name. In such cases, the domain name must be used (for example, fromname@customer-domain.x.x).	
Customer SNMP gateway	IP address of the SMTP mail server gateway that is used to send call home notifications.	

Related reference

"Call home configuration" on page 37
The IBM XIV call home function connects your system directly to the IBM Trouble Ticketing System. The call home function enables both failure and pre-failure notifications to be automatically sent to the IBM Service Center.

Remote support worksheets

Use these worksheets to record connectivity information that is required by IBM service representatives to remotely connect to the XIV system to provide support.

IBM service representatives can use remote support sessions when on-site troubleshooting cannot resolve a problem. Remote access can be done by the XIV Remote Support Center, broadband connection, and modem.

Both XIV Remote Support Center and broadband connections can be set up using either the management ports or a virtual private network (VPN) ports, providing remote access through a network other than the management network.

Management port connection

A network connection can be made using a management port connection on the patch panel. No additional information is needed from the customer to set up this connection.

VPN port connection

A network connection can be made using a VPN port connection on the patch panel.

Fill in the following worksheet only if you are using the VPN port connections for remote support.

Table 25. Virtual private network port connection worksheet

Field	Description	Information
VPN 1	IP address of remote support VPN on port 1	
VPN 2	IP address of remote support VPN on port 2	
VPN netmask	IP address of the VPN netmask	
VPN gateway	IP address of the VPN gateway	

Special instructions

If broadband connection is the method to be used, provide special instructions regarding remote support access to the XIV system (for example, user ID and password that the support representative must use to connect to the VPN client).

Related reference

"Remote support connections" on page 33
IBM authorized personnel use remote support connections to perform real-time problem analysis and isolation.

Contact information worksheets

Use these worksheets to record customer support information.

The customer must complete these worksheets and provide the completed worksheets to the IBM service representative before installation can begin. IBM service representative uses the information recorded in these worksheets configure the XIV system during installation.

Important: It is the responsibility of the customer to update XIV system location and customer contact information as changes occur to ensure that the IBM service representative is able to contact the correct person when an event occurs in the XIV system that requires service.

Customer name and special instructions

Fill in the following worksheet to identify the customer name and any special instructions regarding remote support access to the XIV system.

Table 26. Customer name and special instructions worksheet

Field	Description	Information
Customer name	Name of the customer or company for whom support is provided.	
Special instructions	Any special instructions regarding remote support access to the XIV system	

Primary contact

Fill in the following worksheet to provide information about the person to engage first if a repair is required for the XIV system.

Table 27. Primary contact worksheet

Field	Description	Information
Name	Name of the primary contact	
E-mail	Email address of the primary contact	
Office phone	Office phone number, including the country code and area code, of the primary contact	
Mobile phone	Mobile phone number, including the country code and area code, of the primary contact	

Table 27. Primary contact worksheet (continued)

Field	Description	Information
Calling hours	Calling hours, or duty shift, for the primary contact (for example, 08:00 - 16:00, or 24 x 7)	
Time zone	Time zone for the primary contact (for example, GMT -4, or UTC -4)	

Secondary contact

Fill in the following worksheet to provide the information about the person to engage if a repair is required for the XIV system and the primary contact is not available.

Table 28. Secondary contact worksheet

Field	Description	Information
Name	Name of the secondary contact	
E-mail	Email address of the secondary contact	
Office phone	Office phone number, including the country code and area code, of the secondary contact	
Mobile phone	Mobile phone number, including the country code and area code, of the secondary contact	
Calling hours	Calling hours, or duty shift, for the secondary contact (for example, 08:00 - 16:00, or 24 x 7)	
Time zone	Time zone for the secondary contact (for example, GMT -4, or UTC -4)	

IBM contact

Fill in the following worksheet to identify the IBM service representative to contact when problems occur.

Table 29. IBM contact worksheet

Field	Description	Information
Name	Name of the IBM contact	
E-mail	Email address of the IBM contact	
Office phone	Office phone number, including the country code and area code, of the IBM contact	
Mobile phone	Mobile phone number, including the country code and area code, of the IBM contact	
Calling hours	Calling hours, or duty shift, for the IBM contact (for example, 08:00 - 16:00, or 24 x 7)	
Time zone	Time zone for the IBM contact (for example, GMT -4, or UTC -4)	

Location

Fill in the following worksheet to identify the street address where the XIV system is located.

Table 30. Location worksheet

Field	Description	Information
Site name	Name of the site where the XIV system is located	
Building		
Street	Street name and number	
City	City or province	
State		
Zip code	Zip code or postal code	
Country		

Remote support contact

Fill in the following worksheet to provide information about the person at the customer site that can authorize remote support access or can enable the XIV system for remote support.

Table 31. Remote support contact worksheet

Field	Description	Information
Name	Name of the remote support contact	
E-mail	Email address of the remote support contact	
Modem phone number	Modem phone number, including the country and area code, for the IBM XIV modem	
Office phone	Office phone number, including the country code, of the remote support contact person	
Mobile phone	Mobile phone number, including the country code, of the remote support contact person	
Calling hours	Calling hours, or duty shift, for the remote support contact (for example: 08:00 - 16:00, or 24 x 7)	
Time zone	The time zone for remote support contact (for example, GMT -4, or UTC -4)	

Related reference

"Remote support connections" on page 33
IBM authorized personnel use remote support connections to perform real-time problem analysis and isolation.

"Call home configuration" on page 37
The IBM XIV call home function connects your system directly to the IBM Trouble Ticketing System. The call home function enables both failure and pre-failure notifications to be automatically sent to the IBM Service Center.

Fibre Channel worksheet

Use this worksheet to record Fibre Channel information.

Are all Fibre Channel connections multimode?

__ Yes

__ No

Related reference

"Fibre Channel logical network configuration" on page 25
You can use a high availability configuration or a single switch configuration in your Fibre Channel network. Each interface module in the IBM XIV Storage System has four Fibre Channel ports.

"Mixed iSCSI and Fibre Channel host access" on page 28
Do not mix iSCSI and Fibre Channel host access. If your situation requires you to temporarily mix iSCSI and Fibre Channel host access to migrate data, you must plan carefully to avoid data loss.

"Fibre Channel physical requirements" on page 22
The IBM XIV Storage System is available in 6 and 9 - 15 module configurations.

iSCSI worksheet

Use this worksheet to record iSCSI information.

Table 32. iSCSI configuration information worksheet

Module number	Port number	Maximum transmission unit	IP address	Network mask	Default gateway
	1				
	2				
	1				
	2				
	1				
	2				

Related reference

"iSCSI network configuration" on page 28
You must gather the necessary information for the iSCSI network before you start the configuration process.

"iSCSI logical network configuration" on page 27
You can select from several options when deciding how to configure your logical network.

"Mixed iSCSI and Fibre Channel host access" on page 28
Do not mix iSCSI and Fibre Channel host access. If your situation requires you to temporarily mix iSCSI and Fibre Channel host access to migrate data, you must plan carefully to avoid data loss.

"iSCSI physical requirements" on page 22
iSCSI ports are available in XIV model A14 rack configurations with nine or more modules.

Host requirements worksheet

Use this worksheet to record information about your hosts.

Table 33. Host requirements information worksheet

	Host 1	Host 2	Host 3	Host 4	Host 5	Host 6
Operating system						
Operating system version						
Fibre Channel or iSCSI						

Table 33. Host requirements information worksheet (continued)

	Host 1	**Host 2**	**Host 3**	**Host 4**	**Host 5**	**Host 6**
HBA vendor						
HBA model						
HBA firmware version						
Hardware architecture						
32 bit or 64 bit						
Applications						
Clustering software						
Logical volume manager						
Failover (Yes or No)						
Load balancing (Yes or No)						
File system type						
Comments						

Chapter 10. Specifications (pre-August 2009 racks)

This information describes the specifications for racks ordered with feature code 1100 (interface module). Racks ordered August 2009 or later use feature code 1101 (dual CPU interface module), which supersedes feature code 1100. Racks ordered with feature code 1100 are referred to as "pre-August 2009 racks."

Power consumption (pre-August 2009 racks)

This information provides a complete power consumption listing for racks manufactured before August 2009.

Table 34. Power consumption for partial and full rack configurations (pre-August 2009 racks)

Rack configuration	Number of modules (See Note 1.)	Power consumption in kVA (Volt-Amps/1000)
Full	15	8.5
Partial (See Note 2.)	14	7.9
	13	7.4
	12	6.8
	11	6.2
	10	5.7
	9	5.1
	6	3.5

Notes:

1. Seven-module and eight-module configurations are not supported.
2. The power consumption for partial rack configurations is the typical value and is provided only for reference purposes. To support concurrent capacity upgrades, the installation site must provide sufficient power capacity to support a full rack configuration.

Cooling and environmental considerations (pre-August 2009 model A14 racks)

This information provides considerations for cooling, air circulation and flow, and the operating environment for racks manufactured before August 2009.

Cooling requirements

Cooling (thermal dissipation) requirements are shown in Table 35.

Table 35. Thermal dissipation for partial and full rack configurations (pre-August 2009 racks)

Rack configuration	Number of modules (See Note 1.)	kBTU per hour
Full	15	29.0

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Table 35. Thermal dissipation for partial and full rack configurations (pre-August 2009 racks) (continued)

Rack configuration	Number of modules (See Note 1.)	kBTU per hour
Partial (See Note 2.)	14	27.0
	13	25.1
	12	23.2
	11	21.3
	10	19.4
	9	17.4
	6	11.9

Notes:

1. Seven-module and eight-module configurations are not supported.
2. The thermal dissipation for partial rack configurations is the typical value and is provided only for reference purposes. To support concurrent capacity upgrades, the customer site must provide cooling arrangements to support a full rack configuration.

Air circulation

- Cold air is provided from the front of the rack
- Hot air is exhausted from the back of the rack

Airflow

Airflow requirements are shown in Table 36.

Table 36. Airflow requirements for partial and full rack configurations (pre-August 2009 racks)

Rack configuration	Number of modules (See Note 1.)	Cubic feet per minute (CFM) (See Note 3.)
Full	15	820
Partial (See Note 2.)	14	770
	13	720
	12	660
	11	600
	10	550
	9	500
	6	340

Notes:

1. Seven-module and eight-module configurations are not supported.
2. The airflow for partial rack configurations is the typical value and is provided only for reference purposes. To support concurrent capacity upgrades, the customer site must provide sufficient airflow space to support a full rack configuration.
3. The airflow values assume a maximum inlet air temperature of 25°C (77°F).

Dimensions (pre-August 2009 racks)

This information provides dimensions, clearance, and space requirements for racks manufactured before August 2009.

Dimensions for racks manufactured before August 2009 are as shown in Table 37.

Table 37. Rack dimensions and clearances (pre-August 2009 racks)

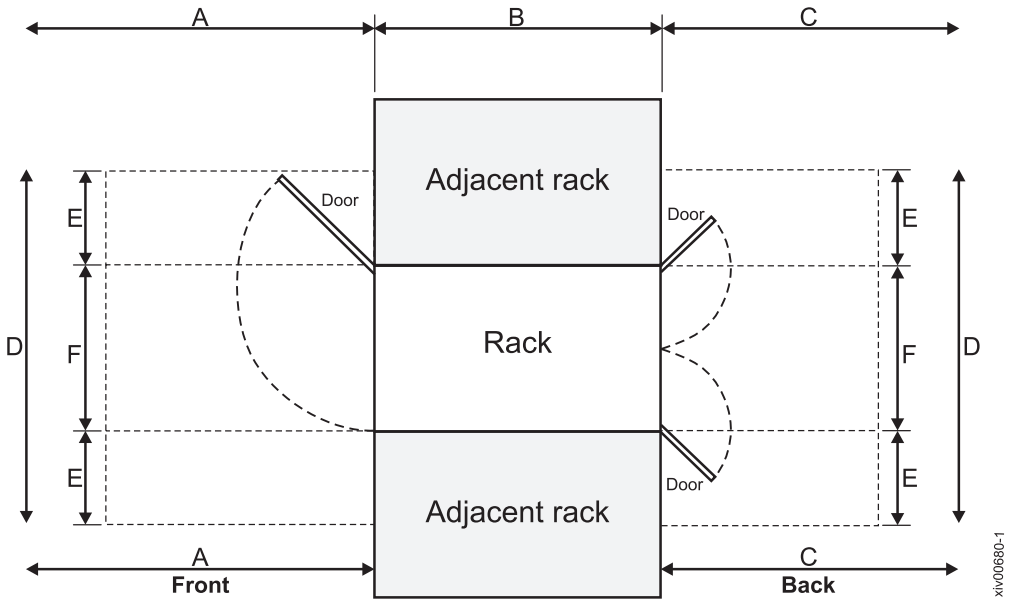
	Metric (mm)	**English (in.)**
General dimensions		
Height	1991	78.4
Width	600	23.6
Depth	1092	43.0
Clearances		
Front door	1200	47.2
Back door	1000	39.4
Service and cooling	See Figure 11 on page 54 for detailed information.	

Sides

You must adhere to the following space requirements around the sides of the racks:

- You must place racks no closer than 450 mm (17.7 in.) to a wall.
- You can position rack alongside (next to) other racks.
- There are no space requirements between adjacent racks.

IBM service representatives must have enough space to open the front and rear covers to service the unit, and must also be able to remove components and other assemblies from the unit. See Figure 11 on page 54 for minimum service clearances.



A 1200 mm (47.2 in.)
B 1092 mm (43.0 in.)
C 1000 mm (39.4 in.)
D 1500 mm (59.1 in.)
E 450 mm (17.7 in.)
F 600 mm (24.0 in.)

Figure 11. Top view of clearance requirements for service and cooling

Physical space, weight, and acoustics (pre-August 2009 racks)

Use this checklist to ensure that your installation location meets the minimum requirements to install an IBM XIV Storage System rack that was manufactured before August 2009.

Space

__ 1991 mm (78.3 in.) height is available
__ 600 mm (23.6 in.) width is available
__ 1092 mm (43.0 in.) depth is available
__ 1200 mm (47.2 in.) front door clearance is available
__ 1000 mm (39.4 in.) back door clearance is available
__ 450 mm (17.7 in.) clearance from walls to side is available

Weight

__ 876 kg (1931 lb)

Acoustic output

__ Sound power, LwAu = 8.4 bels

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